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THE IRON AGE

THURSDAY, OCTOBER 4, 1888.

New Duplex Pump.

We illustrate on this page a duplex steam pump of new pattern, more especially intended as a means of boiler supply. It is built by Mr. John H. McGowan, of Cincinnati, Ohio, and, as the engravings will show, embraces a number of interesting features.

The steam end has valves and steam-ports and packing similar to other patterns of duplex pumps. The mechanism mov-

the lever A (see Fig. 2) has cast on its horizontal branch B the lug *b*, which works in an opening in the link D' (Fig. 1), connecting the lever A with one of the valve-rods, while the lever A' has keyed on its horizontal branch E a lug *c*, which works the link D. An examination of the engravings will make the action readily understood.

The pump end is substantial. The valve arrangement is entirely new in principle and construction. There are no

Under the superintendence of M. Abt, the rails describe one grand curve formed upon an angle of 112°, and, by an arrangement of the Abt system, the journey is made as steadily and smoothly as upon any of the straight funicular lines previously constructed. The Burgenstock, being almost perpendicular, it would have been impossible to construct a railway upon the old plan. From the shore of the Lake of Lucerne to the Burgenstock is 1330 feet, and it is 2860 feet above the level of the

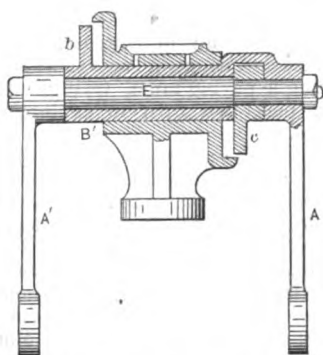


Fig. 2.—Cross Section of Valve Levers.

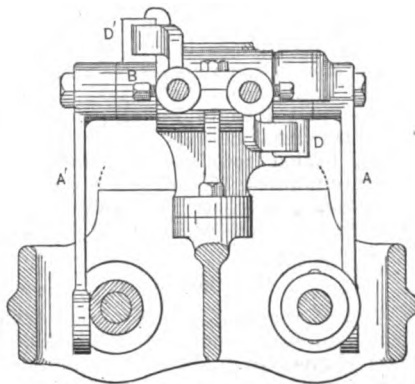


Fig. 3.—End View of Levers.

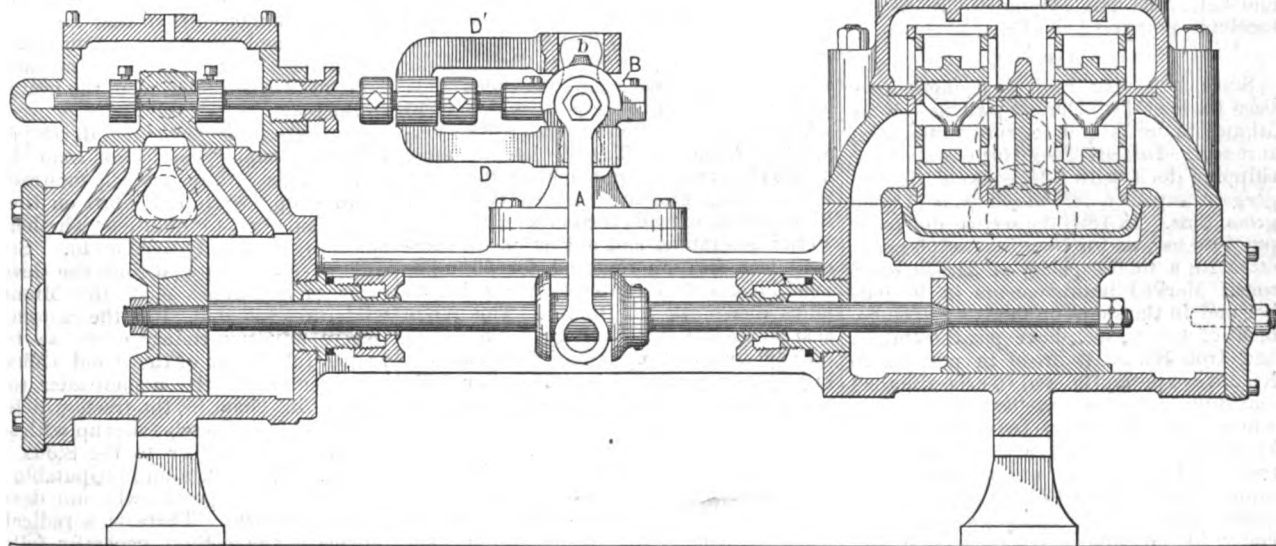


Fig. 1.—Longitudinal Section.

DUPLEX BOILER FEED PUMP, BUILT BY THE JOHN H. MCGOWAN CO., CINCINNATI, OHIO.

ing the steam-valves is simple and effective. The valve-rods are supported and guided in a straight line by the standard on which the valve levers A and A' work. It will be noticed that the levers work on a common center, and that the links that move the valve-stems come in contact with the collars on the valve-stems. Any undesirable lost motion that may arise from wear can be taken up by adjustment of the collars on the valve-stems. These adjustments may be repeated until the lost motion caused by the wear of any or all parts of the valve gear equals the space or lost motion necessary in a new pump between the valve-moving links and the collars on the valve-rods to insure full strokes of the main pistons. We need perhaps scarcely explain that the left-hand valve-lever works the steam-valve of the right-hand pump, and *vice versa*. Thus

gratings to clog up, nor are there any valve-stems to be broken off. By the construction of the valve-seats and the manner in which they are arranged to fit the valve-boxes it is impossible for the seats or valves to become misplaced. By the removal of the cap supporting the air chamber all the valves and seats can be removed or replaced at will. Another valuable feature in these pumps is that the valve-box can be taken off and turned to change the position of the suction and force pipe openings. Both steam and water pistons have metallic and self-adjusting packing, by which the friction is reduced to a minimum.

An Electric Mountain Railway.—An electric mountain railway, the first of its kind, has recently been opened to the public at the Burgenstock, near Lucerne.

sea. The total length of the line is 938 meters and it commences with a gradient of 32 per cent., which is increased to 58 per cent. after the first 400 meters, and this is maintained for the rest of the journey. A single pair of rails is used throughout, with the exception of a few yards at half distance to permit the two cars to pass. Through the opposition of the Swiss Government each car is at the present time only allowed to run the half distance, and they insist upon the passengers changing, in order, as they say, to avoid collision or accident. The motive power, electricity, is generated by two dynamos, each of 25 horse-power, which are worked by a water-wheel of nominally 125 horse-power, erected upon the river Aar at its mouth at Buochs, 3 miles away. The electric current is conducted by means of insulated copper wires. The loss in transmission is estimated at 25 per cent.

Minnesota Iron Ores.—I.

BY JOHN BIRKINBINE, PHILADELPHIA, PA.

The iron mines of Minnesota will supply close to 500,000 tons of ore in 1888, the question of how much the total output falls below or exceeds 500,000 gross tons to be decided by the number of vessels which load ore at satisfactory rates at Two Harbors. The Minnesota Iron Company were fortunate in making vessel charters, by which it is understood that the lake freight on most of the ore from their Tower mines costs from \$1.10 to \$1.30 per ton, but for any excess of ore, and for the output of the Chandler mine, which has only had railroad connection since August 15, more advanced rates, possibly \$1.60 to \$1.75 per ton, must be paid. These, however, will hardly reach the extravagant figures of 1887, when heavy shipments from the Gogebic mines made late charters bring \$2.75 or even \$3 per ton for ore from Ashland, Wis., or Two Harbors, Minn. The large all-rail shipments will also have a tendency to keep lake freights lower than they were last year, and it is not improbable that the proposed increase of the lake marine may encourage vessel owners to hold the rates for water transportation within reasonable limits. The proposition to establish at Sandusky a large iron shipyard has brought before the public, through the medium of published correspondence, a more intimate knowledge of the carrying capacity of the vessels now engaged, and the cost and profit of conveying ore from the Lake Superior and Lake Michigan shipping ports to the receiving ports on Lake Erie.

TWO HARBORS.

Since last year radical changes have been made at Two Harbors, whence all the Minnesota ore is sent forward to the blast furnaces. In 1887 Two Harbors had one shipping dock with 124 pockets, the aggregate capacity of which was 13,500 gross tons. In 1888 the second dock was put into use, and there are now 206 pockets, with a total capacity of 21,000 gross tons. Marked improvements in the harbor and in the shops on shore, a rearrangement of tracks, &c., have put the Duluth and Iron Range Railroad in position to handle ore promptly, and to keep the road and rolling stock in excellent order. The whole complement of over 350 cars is kept fully employed, and frequently a train is loaded with ore at the Tower mines, runs 70 miles to Two Harbors, discharges its load into the pockets, returns empty to the mines, is loaded again, and on its way to the lake within 24 hours. A shortage of vessels, therefore, speedily produces a stagnation, and early in September all the pockets were full, and 1800 tons of ore in cars awaited a chance to be dumped. The railroad has been carrying about 20,000 tons per week, and the shipments up to the close of August reached an aggregate of 227,500 tons. As lake navigation will not be suspended until the middle of November, the probabilities are that the Minnesota Iron Company's mines will produce 450,000 tons and the Chandler mine 40,000 tons of ore, bringing the total for Minnesota close to 500,000 tons for 1888.

ALL-RAIL SHIPMENTS.

Some of the output will go by all-rail routes, and if the present rate of \$2.50 per ton from Tower to Chicago is maintained the quantity of ore thus handled will be considerable. Up to September 1, 28,500 tons of ore had been sent forward in this way. The ore at present goes via the Duluth and Iron Range Railroad to Duluth, the St. Paul and Duluth Railroad to St. Paul, and by the "Burlington" system to Chicago, a distance of nearly

700 miles. The severe winters of the Northwest offer little discouragement to "all-rail" shipments of the hard lump ores from Tower mines, and experience in shipping the softer Gogebic ores teaches that the greatest annoyance arises from the cars meeting a thaw and subsequently freezing *en route*. With continuous rail shipments and augmented lake transportation it is moderate prophecy to figure on an increase for 1888 of 25 per cent. over the output, of nearly 395,000 gross tons in 1887. Some of the Minnesota ore goes this year to Troy N. Y., Scranton, Pa., Pottstown, Pa., and to some of the Lehigh Valley blast furnaces. This suggests the thought that what the demagogue is pleased to designate as "monopolies" must in this case be satisfied with fairly moderate profits. For the mining company removes the ore from the ground, loads it into cars, one railroad company transports it 70 miles, dumps it into expensive ore docks, and thence into vessels which carry it the entire length of Lakes Superior, Huron and Erie to Buffalo; there it is shoveled into buckets, lifted from the hold, loaded into cars and carried by another railroad 800 miles across the Empire State, to meet practically at tide water foreign ores which pay a duty of 75 cents per ton.

THE IRON BELT.

The Vermillion range, from which comes all of the iron ore which has so far been shipped from Minnesota, exhibits the ore bearing rocks, extending from Tower (70 miles north of Duluth) in a northeasterly direction for 50 miles to the Canadian border, and the jasper formation in which the ore is found is traced also into the Dominion. All of the water from this range finds its way into Rainy Lake and river, and thence into Hudson's Bay. The Mesabi range of granite, which is 15 miles south of the Western end of the Vermillion range at Tower, has a more northerly trend, approaching the Vermillion range near the National boundary. It, however, extends further west than the Vermillion range, and indications of magnetic iron ores are reported for 80 miles west of and 50 miles east of a point 55 miles due north of Duluth. The range also passes into the Dominion. The ore so far explored in the Mesabi range occurs in jasper or quartzites in a ridge or hills just south of the granite range. Most of these ores are magnetites, but some hematites in jasper are also found. An interesting discovery has lately been made close to the line of the Duluth and Iron Range Railroad, 48 miles from Two Harbors, which is being thoroughly explored. Indications favor finding a deposit of soft hematite ores similar to some of the Menominee or Gogebic ores. The Mesabi range is the water-shed between the drainage of Lake Superior and that of the Mississippi River and Hudson's Bay; the prevailing opinion being that magnetites occur on the Superior slope and red hematites on the other. The exceptions seem too numerous to make the rule hold good, and some excellent cores of magnetite have been taken by diamond drills from the vicinity of the Vermillion range.

Explorations are much less active than last season, and the Chippewa Indians who fancied that they were prospective millionaires, will now sell a birch bark canoe for \$2, which they sold several times over in 1887 to various prospectors for from \$10 to \$15. The energy displayed in prospecting last year was commendable, and if "good turns" are made on some ventures, the profit will be well earned. Access to the range was, until lately, possible only by canoe route, and as a consequence the amount of luggage was reduced to a minimum. There is considerable romance in the prospect of a ride in a real birch bark canoe, but when four or five persons get

into one of these apparently frail structures bringing the gunwales into close proximity to the outside water-level by the $\frac{1}{2}$ ton of humanity and luggage it carries, a few hours will reduce the sentimental to the real. Kneeling at bow or stern and wielding a paddle continuously, is as monotonous, and possibly more wearisome than sitting in a cramped position on a "pack," in either case balancing constantly so as to prevent the canoe capsizing by the waves on the lakes, or by sudden turns in the narrow creeks. When relief comes, it is to shoulder a rude knapsack or "pack" with head strap and assist over the portage, wading through swamps, slipping from logs or scrambling over rocks and through underbrush until the canoe is lifted from the head of the Indian, and again placed in the water ready for its load. Many accustomed to the conveniences and luxuries of city life have made long canoe journeys into this wilderness, tramped through rough or swampy ground in summer, or paddled over ice and snow on snow shoes in winter, seeking a paying mine, trying with compass, pick and drill to explore nature's secrets.

Up to the present time the prospects have been numerous and the mines few, but there seems little reason to doubt that development will prove the deposits of iron ore in Minnesota to be both numerous and important; the extension of railroad facilities bringing into prominence mines whose names may become as familiar as those of some of the Marquette mines. At present, however, there appears to exist no cause which would have necessitated the transfer of the interest controlled by Mr. Charlemagne Tower, of Philadelphia, other than that he received his price, and developments must increase in number and importance before another railroad is constructed from the iron range to the lake.

One retarding factor to developments is the uncertainty of fee of some lands, owing to the failure of the homesteader to "prove up," or to the efforts on the part of speculators to question whether the land laws were fully lived up to. Several suits have been entered since the development of iron mines made the Minnesota wilderness valuable. It is the custom now (where any uncertainty exists as to the proper fulfillment of the Land Office requirements) for the homesteader to renounce his claim to the tract, which the purchaser immediately takes up with script issued to soldiers or to the Sioux half-breeds. This makes an indisputable title and protects the parties who are developing the property. There is a radical difference in the method generally followed in opening up the Vermillion range to that pursued in the Gogebic range two years ago. The properties in the former are to a large extent being explored by the owners, no leases of importance having been made except at the Chandler mine. Several syndicate operations to control large tracts of land in the Vermillion range contemplate the purchase of the land and not the lease. On the other hand, the fee of most of the territory embraced in the Gogebic range was in the hands of a few private owners, or else came into the possession by grant to the ship canal or railroad companies. As a result the realty was not sold, but a lease drawn to the advantage of the land owners was the rule in the Gogebic range, and numerous organizations called "mining companies" placed stocks before credulous investors, offering as an asset an iron-clad contract by which the mining company agreed as lessee to pay a royalty (generally 50 cents per ton) on all the ore taken from the property, but in any event, whether ore was mined or not, the lessor was to receive pay for an amount which was fixed as the minimum. The wild speculation which resulted in placing over \$100,000,000

nominally of "mining stocks" on the market at ridiculously small percentages of the "par value," and the collapse of the bubble which were to be expected, will be beneficial to the Vermillion range by encouraging investments approaching more closely the intrinsic value of property, and by insuring development less rapid but more permanent, because it will be done by the owners of property and not by lessees.

It may be paradoxical to assert the fact, but it is evident that the absence of railroad facilities along the Vermillion range is to its future advantage. The Duluth and Iron Range Railroad passes over the Messabi range, and, after meeting the Vermillion range, follows practically the strike of the ore-bearing rocks to Ely, from which it can and probably will be extended eastward. This gives convenient access to the canoe routes, and permits of getting tools and provisions into the camps of the explorers; it can also deliver the necessary machinery for preliminary

numbered as they are received. The former given an even number, the latter an odd number.

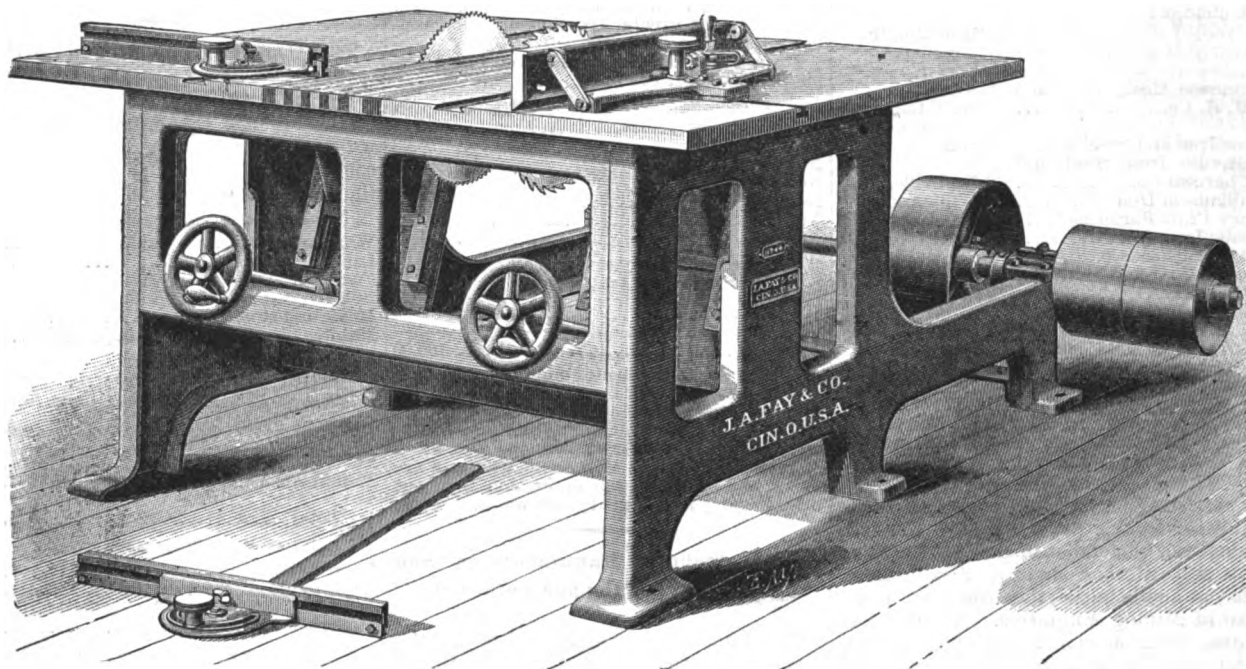
Double Saw Machine.

J. A. Fay & Co., of Cincinnati, Ohio, are bringing out a double saw machine especially adapted to the wants of cabinet-makers. The general appearance of the machine is shown in the annexed engravings. The frame is exceptionally heavy and strong, the arbors large in diameter with long bearings, each arbor and frame being adjusted independently of the other in plane gibbed ways, so arranged as to always retain the same general tension of the belt at any point to which they may be elevated. The hand wheels for use are convenient to the operator, and the table always remains at the same height. The top is of iron, carefully planed, and measures 4 feet 2 inches by 4 feet 11 inches. It is fitted upon one side with an adjustable fence,

close of the blow he charges a few shovelfuls of sand. The ferromanganese is added in a liquid state, being melted in crucibles. After the addition of the ferromanganese the metal in the converter is thoroughly rabbled, and then the steel is cast as quickly as possible. At the time of our visit a number of large rolls were being cast for Jones & Laughlins, of Pittsburgh, the Troy Steel and Iron Company, and others. The blooming mill has been idle for a considerable period and the building is soon to be used for rolling cast-steel wheels.

Twin-Screw Steamers.

Twin screws driven by triple-expansion engines have in so many cases proved more effective and economical than the side-wheelers and propellers built a few years ago that the question of converting old side-wheel steamers into twin screws is likely to arise. The experience of an



DOUBLE SAW MACHINE, BUILT BY J. A. FAY & CO., CINCINNATI, OHIO.

development at points from which it can be carried on sledges in winter to most of the properties presenting an encouraging outlook. There is no doubt but what the railroad will be extended as rapidly as circumstances demand, or, if not, that other railroads will be constructed to handle the ore which is taken out in quantity from any mines which may be opened. This will encourage judicious exploitation. On the Gogebic range the railroad followed the ore strike and preceded much of the development, thereby stimulating the operators to bring the mines into the list of shippers as soon as machinery could be set up; opening some of them in a temporary manner and obtaining cheap ore for the present, which must be more than offset by augmented cost in the future.

During a recent visit to the Philadelphia Shafting Works, G. V. Cresson, Philadelphia, we were impressed with the methodical manner in which all the details of a large business were being carried through in every department. Mr. Cresson has many "wrinkles" which save time and avoid annoyance. A very simple plan has been adopted by him to distinguish between city and country orders. All are

which can be set to different angles, and is moved in planed ways to and from the saw. The other side carries a cutting-off slide, provided with stops to govern the length to be cut, which can also be set at varying angles. 1 slots for miter or cutting-off slides are placed close to each saw. The space between the two saws is of wood, and may be thrown back, allowing free access to the saws. Grooving, rabbeting, plowing and other heads can be used in place of either saw, which may be both rip or rip and cross-cut, according to the work required to be done.

The Pittsburgh Steel Casting Company.—Under the management of William Hainsworth, who seventeen years ago began with a single crucible, the Pittsburgh Steel Casting Company, at Pittsburgh, has acquired a national reputation for crucible and Bessemer steel castings. During a recent visit we found the works engaged in a large variety of work in the crucible department, and had occasion to witness a blow in the Bessemer department. The latter is equipped with two converters casting into one pit. Mr. Hainsworth melts the best stock available, the differences in his practice from that usual in Bessemer works being that toward the

English railroad company in this direction is therefore interesting. The London and Northwestern Railway some months since placed their paddle-wheel steamer, "Duchess of Sutherland" (built in 1869), in the hands of Messrs. Laird Brothers for conversion into a twin-screw steamer, with the expectation that her efficiency for their cross-channel cattle trade would be improved, and that considerable gain in economy would result from the introduction of more modern machinery. The work has been completed, and on a recent trial trip the vessel ran 14½ knots, the engines developing 1400 horse-power. The old machinery, side wheels and boxes were removed, but the forward and after sponsons or guards and their houses on each side are retained and connected, the houses forming quarters for the ship's officers, storerooms, &c. The old side-wheel space is decked over and formed into a large additional space for cattle. The necessary alterations have been made about the stern of the vessel, and stern tubes and brackets fitted, and the arrangement of engine keelsons, bulkheads, coal-bunkers, &c., has been modified to suit the new machinery. This consists of two sets of triple expansion engines having cylinders 16½-inch, 26-inch and 41-inch diameter, with a stroke of 80 inches, and

working at 150 pounds pressure, steam being provided by two double-ended cylindrical Scotch steel boilers. The carrying power of the vessel has been increased by about 190 tons, large additional deck space for cattle gained, while the net register tonnage has been reduced by 247 tons. The speed has been considerably increased, and the consumption of fuel reduced 60 per cent

The Grading of Southern Pig Iron.

In the New York market report of *The Iron Age* of September 27th we announced that Southern pig iron manufacturers had agreed to change the grading, the new and old grades compared being as follows:

New Grade.	Old Grade.
No. 1 Foundry.....	No. 2 Foundry.
No. 2 Foundry.....	No. 2½ Foundry.
No. 3 Foundry.....	No. 1 Mill.
No. 1 Soft.....	Open Bright.
No. 2 Soft.....	Close Bright.
Silver Gray.....	Silver Gray.
Gray Forge.....	No. 2 Mill.
	Mottled.
	White.

The following companies have agreed to the change:

	Operating the furnaces.
Tennessee Coal, Iron and R. R. Co.....	4 Ensley. 2 Alice. 3 So. Pittsburg. 1 Sewanee.
Sloss Iron and Steel Co....	4 Sloss.
Nashville Iron, Steel and Charcoal Co.....	2 Nashville.
Williamson Iron Co.....	1 Williamson.
Mary Pratt Furnace Co....	1 Mary Pratt.
Roane Iron Co.....	2 Rockwood.
Citico Furnace Co.....	1 Citico.
Dayton Coal and Iron Co., Limited.....	2 Dayton.
Gadsden-Alabama, Furnace Co.....	1 Etowah.
Walker Iron and Coal Co....	1 Rising Fawn.
Chattanooga Iron Co....	1 Chattanooga.
Sheffield & Birmingham Coal, Iron and Ry. Co....	3 Cole.
Eureka Company.....	2 Eureka.
Woodward Iron Co.....	2 Woodward.
De Bardeleben Coal and Iron Co.....	2 De Bardeleben.

As bearing on this subject, we quote the following from a paper read by Kenneth Robertson, general manager of the Sloss Iron and Steel Company, Birmingham, Ala., at a meeting of the American Institute of Mining Engineers. It deals, of course, with the evil as it existed, but—

All strangers visiting this district are struck with the peculiar manner in which the pig iron is graded. There are 11 regular grades, besides which, when Gray Forge is ordered, one-half of Nos. 1 and 2 Mill are shipped. Occasionally there is another grade known as Silvery Mill, which is made so seldom that I cannot describe it, and have no sample to exhibit. Most of you have found it difficult to grade properly and uniformly under the simpler system which obtains elsewhere, and can consequently readily imagine the increased difficulty with us. Each furnace employs an expert, and even with this precaution the system is not conducive, at all times, to amicable relations between buyers and sellers. I am told that it was adopted at the time Southern irons were seeking a market.

The grades are as follows:

No. 1 Foundry (no longer recognized), a large-grained, dark-colored iron with crystallization extending well out to the edges of the pig. In my experience but little of it is made, and I am inclined to regard it more as a freak than a product. An average of three analyses shows 3.66 per cent. silicon in this grade.

No. 2 Foundry (new No. 1) is the equivalent of a No. 1 Foundry at the North. An average of 18 analyses gives 3.02 per cent. silicon.

No. 2½ Foundry (new No. 2) corresponds to No. 2 Foundry elsewhere. An average of eight analyses shows 3.02 per cent. silicon.

No. 1 Mill (new No. 3 Foundry) is also known as No. 3 Foundry, and in it are included irons which are not quite good enough for 2½ Foundry, and also those which are equal to what is known as Gray Forge in the Lehigh Valley and vicinity. The best of this iron is used for foundry purposes. An average of four analyses gives 2.87 per cent. silicon.

No. 2 Mill (new Gray Forge) is between 1 Mill and Mottled, and contains 2.44 per cent. silicon as an average.

No. 1 C. (now Silver Gray) is open-grained Silver Gray. I have but one analysis, which shows 5.25 per cent. silicon.

No. 2 C. (now abandoned) is close-grained Silver Gray. Average of three analyses, 7.09 per cent. silicon.

No. 1 Bright (now No. 1 Soft) is a foundry iron which is light in color but open-grained. It is made by every furnace in every district at times; but it is only in this section that it is separated from the foundry irons. Elsewhere it would be shipped as No. 1 Foundry. Average of three analyses, 3.69 per cent. silicon.

No. 2 Bright (now No. 2 Soft) is one grade lower; is closer grained; and the average of fourteen analyses is 3.11 per cent. silicon. Elsewhere it would be a No. 2 Foundry.

To complete the number, we have Mottled and White, which are the same here as elsewhere.

An idea has been prevalent for a long time that Southern irons are highly siliconized and weak; that the product of the furnaces is not foundry, but chiefly of the lower grades; and that the lower grades are sold with difficulty. The preceding analyses show that the foundry irons do not contain more silicon than irons of the same grade in other districts; the mill irons are higher in silicon than those of Glendon and Andover, but they are sold without difficulty. As to the product of the furnaces, I will give the percentages of each grade which one of the furnaces under my charge made during ten months' working under very disadvantageous circumstances. Other furnaces in the district have undoubtedly done much better; and these figures are not given as typical, but merely to show that we do make foundry iron, and that the greater portion of our product is not of lower grades.

The average of 27 determinations of phosphorus is 0.66 per cent.

Percentages of Old Grades Made.

No. 1 Foundry.....	0.27
No. 2 Foundry.....	26.23
No. 2½ Foundry.....	19.48
No. 1 Mill.....	33.82
No. 2 Mill.....	6.85
No. 1 C.....	0.56
No. 2 C.....	1.39
No. 1 Bright.....	6.07
No. 2 Bright.....	2.76
Mottled.....	2.38
White.....	0.19

Total 100.00

Calling the bright irons Foundry, which they are, the proportion of foundry iron made was 54.81 per cent., probably half the 1 Mill would have been classed as foundry elsewhere. These results are not considered as the *ne plus ultra* of furnace work, but will show what we are doing, and also that the impression that but little foundry iron is made here was erroneous.

The Waterbury Manufacturers and Lake Superior Copper Interests.

An impression widely exists in the metal trades that Connecticut and Massachusetts copper and brass manufacturers are largely interested in Lake Superior copper mining enterprises. In a conversation recently with one of the leading manufacturers of the Naugatuck Valley, we were given the leading historical facts which may have created the impression above alluded to. It appears that in the early history of the opening up of copper mines of the Upper Peninsula, one who had been connected with brass and copper manufacturing in Connecticut was struck by the opportunities offered in the way of the establishment of smelting works at Detroit. The matter was broached to Waterbury mills, and after some hesitation a committee of two was appointed by the latter to investigate on the spot the proposals made. The result was the building of a smelting plant below Detroit, the original capital of the concern, the Waterbury and Detroit Copper Company, being \$20,000. At practically the same time Mr. J. W. Clark and others interested in Lake Superior mining had started works at Houghton, called the Lake Superior Copper Company. Both prospered, the former concern having for its stockholders four of the Waterbury mills. A few years later the two smelting works were consolidated under the name of the Detroit and Lake Superior Copper Smelting Company, which for a good many years handled practically the entire output of mineral from the Lake Superior mines. From time to time the works were en-

larged and the capital increased, the returns being uniformly large. Of the four Naugatuck mills one failed, and its interest was disposed of to a number of parties, the remainder of the holdings being to some extent sub-divided by death and marriage.

Mr. Clark was interested largely in the Osceola Mining Company, and it was through his efforts that his associates, the three remaining brass and copper works in the smelting company, entered into an agreement with him to take the product of the Osceola Mine at a price lower by ½ cent than the market price in New York between the 15th and 25th of each month. This agreement was advantageous to both parties, since it freed the Osceola Company from participating in the sacrifices made by the Lake Superior copper companies on export sales during the existence of the pool. The income of the mills in question was considerably enhanced by the results of their investment in the smelting company, and it is this which is the only direct connection which there is now or has been between the copper and brass manufacturers of New England and the mining interests of Lake Superior.

The Cost of Blooms and Billets.

On page 696 of the "Tariff Statements" of the Finance Committee of the Senate we find the following figures of cost of converting pig into Bessemer ingots, and the latter into blooms and billets:

Cost of Bessemer Ingots

Waste of pig and new material	\$2.80
Labor.....	1.12
Fuel.....	.35
Refractories.....	.15
Molds and stools.....	.24
Maintenance and running expenses.....	.75
Total.....	\$5.41

Cost of Bessemer Blooms from Ingots.

Waste of metal.....	\$0.65
Labor.....	.63
Fuel.....	.25
Maintenance and running expenses.....	.55
Total.....	\$2.08

Cost of Blooms from Pig.

Pig to ingot.....	\$5.41
Ingot to bloom.....	2.08
Total.....	\$7.49

Cost of Bessemer Billets

Waste of metal.....	\$0.90
Labor.....	1.60
Maintenance.....	.45
General maintenance of works and running expenses.....	1.10
Fuel.....	.29
Total.....	\$4.34

Cost of Billets from Pig.

Pig to ingot.....	\$5.41
Ingot to bloom.....	2.08
Bloom to billet.....	4.34
Total.....	\$11.83

No indication is given of the source from which these figures have come, nor is there any clew to the locality. Still they are of much interest, as showing the items of labor, of fuel and of waste. They are valuable, too, as indicating what is the cost of the forms of soft steel given over the cost of pig iron.

Williamson Bros., of Philadelphia, Pa., have received an order from the International Steamship Company for a hoisting engine for their new steamship City of New York. This is doubtless the only American built engine or piece of machinery on this famous vessel. They are also building four hoisting engines for the company's dock in New York city, two of which are double drum hoisters. They have received an order from the Clyde line for four hoisting engines on the steamship Benison, to replace the English ones now on board.

Cost and Prices of Iron Beams.

STATEMENT OF F. J. SLADE, OF NEW JERSEY.*

There is probably no branch of iron manufacture that requires such heavy and expensive machinery for the output of so little product as that in question. The average output of each of the mills engaged in this manufacture in the year 1887, in which year the product was larger than in any previous year, was less than 9000 tons. This quantity is much less than the product of a steel-rail mill in a single month. This great difference is due to the fact that steel rails are rolled on orders for thousands of tons, of a single pattern and of uniform length, thus enabling every operation of the works to be systematized to the highest degree, and special machinery to be devised to reduce the cost of each item to a minimum.

In the manufacture of rolled beams, however, the orders are for quantities seldom as much as 50 tons, to be made at a given time, usually for lots of a single car-load or less. While the quantity of beams in large fire-proof buildings seems considerable, the fact is that, being erected only in large cities, the total quantity of beams required for them is, after all, small. Moreover, the orders are not given in such a way as to enable the beams to be rolled in quantity, as in the manufacture of rails, but are given out a story at a time, each containing a great variety of sizes and lengths, requiring constant changes of rolls, and, consequently, constantly interrupting the manufacture.

The variety of regular patterns is so great that a period of one or two months usually elapses from the time any one is rolled till it can be again made, and, consequently, it is necessary, in order to ship beams as required, to carry a large stock of all sizes, and to cut from this beams of such sizes as cannot be rolled promptly. The waste in this operation is very large, and, as it applies to a very large proportion of the total business, becomes an important factor in the cost. It is evident, therefore, that no two branches of manufacture could be more unlike than the manufacture of steel rails and that of rolled beams—the one the most uniform, and dealing with immense quantities, the other cut up into little lots of the most diverse character.

As already stated, the machinery required for the production of these large sections is so expensive that the capital invested in proportion to the yearly product is very great. Hence it is impossible that any profit can be realized unless the beams be sold at a price considerably above that charged for such staple articles as rails or merchant bars. It is popularly considered an axiom that competition for orders will necessarily cease when the price obtained ceases to yield a profit, and that, therefore, unrestricted competition will insure the manufacturer as large a profit as he is fairly entitled to. Every manufacturer knows that this is entirely untrue. The cost of every manufactured product is made up of two classes of expenses—namely, those which depend upon the output, such as material, labor and fuel, and those which must be met whether or not any product be made, such as taxes, rent, interest on mortgages, salaries, general expenses, &c. There will, of course, be no competition for work at prices below those which will cover the expenses of the first class, but the price must be sufficient to cover both classes of expense before any profit can be realized, and the keenest competition occurs when the ruling price is such as to somewhat more than cover the first class

without fully meeting the second, because there is then a life or death struggle to reduce the inevitable loss which stares the manufacturer in the face. Under such circumstances there is no escape from bankruptcy except in some means which will limit competition.

It has been charged that a "trust" exists among the makers to maintain an exorbitant price for this product. It is true that to prevent ruinous competition there have during the past 16 years, with a single interval, been agreements of various kinds between the makers of beams to maintain the price at a figure that would yield a fair profit. We claim that the public have no right to the products of labor at a less price than will yield a fair profit on that labor. We claim also that when prices fall below the point at which this can be secured, it is the natural right of any man to agree with his competitors to maintain prices at a fair figure. We claim, indeed, that it is the duty of the manufacturer so to protect his investment, for capital invested in plant for a profitless manufacture cannot be withdrawn, such works being entirely unsaleable, and, therefore, the manufacture must be made profitable or the capital is practically destroyed. That nothing more than this has been attempted by the makers of beams is susceptible of easy proof. During the whole period referred to the profits on the capital invested have not amounted to 10 per cent. per annum, while the public have had the full benefit of the cheapening of cost by the reduction in the cost of raw material and the improvement of processes, the prices at which beams are sold to-day being but a trifle over one-half of that prevailing in 1873.

There is no complaint from our customers of the operations of the so-called combination (there is no "trust" whatever); on the contrary, the course pursued has their support and approval. This is due to the fact that we have always made it a principle to make absolutely no discrimination between one party and another, and, therefore, every buyer is sure that he is on the most favorable basis in relation to his competitors. There has never been the slightest effort to coerce any one, either rival manufacturer (of whom there have been and are several) or purchaser, either from engaging in the manufacture, or from buying their beams of parties not under agreement, or importing them from abroad. The beams can be and are now laid down here at less than the ruling American price. Their quality, however, is so inferior that in most cases the American beams are preferred.

We hold, therefore, that there has been nothing in the conduct of the beam-makers to warrant a reduction in the duty on this article, and to do this because they have taken rational means to protect themselves from loss would be an act of warfare which Congress has no warrant for waging upon them. It is no part of its duty to destroy the reasonable profits of manufacturers, nor to take away their natural rights in order that the rest of the public may for a time profit by their ruin. It is for the interest of all that all capital invested in useful industry should be fairly profitable, and therefore where, as in the present case, no injustice can be shown, but, on the contrary, a record that has won the approval of all concerned, it would be a gross wrong for Congress to discriminate against this industry.

The Michigan Central Railroad has for some time past, in connection with its track work, been operating a portable steel rail saw which was designed and built for them by the Industrial Works, of Bay City, Mich. Much remarkable work in cutting

off the ends of battered rails has been done with this machine, but the maximum yet reached was a recent accomplishment. On September 12 Mr. J. B. Morford, superintendent of the Canadian Southern division, telegraphed the Industrial Works as follows: "We have beaten the record with our rail saw, having cut and drilled (both ends) 372 rails in 10 hours' service on Tuesday, the 11th inst."

Machinery of the Steamship City of New York.

So much interest has been centered in the new Atlantic steamer City of New York, of the Inman and International Line, and the ship herself is such a striking example of progress in marine architecture and engineering, that a general description of some of her machinery will, no doubt, prove acceptable. We therefore reprint the following from the London *Engineer*:

The steering gear is Brown's patent, made by Messrs. Brown Bros., of Rosebank Works, Edinburgh. In each of the two main engine rooms is placed one of Brown's hydraulic engines, which supplies a system of mains, traversing the ship fore and aft with water at a pressure of about 1000 pounds on the square inch. The engines are vertical, compound rotative, and pump the water into a steam accumulator: the steam at 150 pounds on the square inch driving down a piston, the thick rod of which plays the part of the ram of an ordinary dead weight accumulator. The pressure water is employed for working the hatch derricks, weighing the anchor, &c., and also for steering.

The City of New York has an enormous rudder, partially balanced, and of peculiar construction. It will be remembered that the ship is on the Admiralty auxiliary list, and in order to render her rudder safe from hostile fire it is wholly submerged. There is no rudder head to be seen from the outside; inside it terminates in the after peak below water-level. It is fitted with a tremendous crosshead or tiller which is operated by two hydraulic rams. Room for these could not be found sufficiently far aft, so they are linked to the crosshead or tiller, as it may be called, by a round steel bar 12 inches in diameter, and about 12 feet long.

The rams are about 18 inches in diameter and have tremendous power over the rudder. In order to provide against the effect of shocks caused by the impact of the waves there is a loaded relief valve on each of the hydraulic presses. The water is admitted to either press by valves which are situated near the bow of the ship. These valves are plain slides in a small box, and they are controlled by a tiller about as large as would be used in a 5-ton yacht. The tiller actuates one end of a short lever. The fulcrum end of this lever is controlled by an arm on the vertical spindle of a quadrant which lies under the deck. Two steel wire ropes, each with a breaking strength of 7 tons and stressed to about $\frac{1}{4}$ ton, run from the rudder head to the quadrant. The effect is precisely that of the bunting gear in a steam steering gear. As soon as the steersman puts the tiller he holds to port or starboard the appropriate valve just under his feet is opened. The rudder then moves and through the medium of the wire rope it closes the valve so that the rudder is held in its new position. Another movement of the tiller opens the valve. The corresponding motion of the rudder shuts it again, and so on. Thus the great ship can be steered by a boy. The practice was so novel to the men that it was difficult at first to get a straight course kept by those who had been accustomed to a wheel, and we are told that the best steersman on board was

* Argument before the Senate Finance Committee.

a quartermaster well up in yacht sailing. The engines which supply the hydraulic power are extremely ingenious. One very beautiful device is that by which they are automatically rendered non-compound for half a stroke in order that they may start with certainty after standing. They run quite freely and steady at any speed and for any position of a stroke required to keep the accumulator up. A complete electric plant has been fitted on board, the power being supplied by five engines and dynamos placed on a platform between the two main engines and above the level of the top of the cylinders. These engines and dynamos supply current not only for light but to four large horizontal fans on the hurricane deck driven direct by motors. These fans and motors are located in the tops of ventilating shafts extending down into the depths of the ship from which they draw air. This is, so far as we know, the first time that electricity has been used for ventilating purposes in a ship.

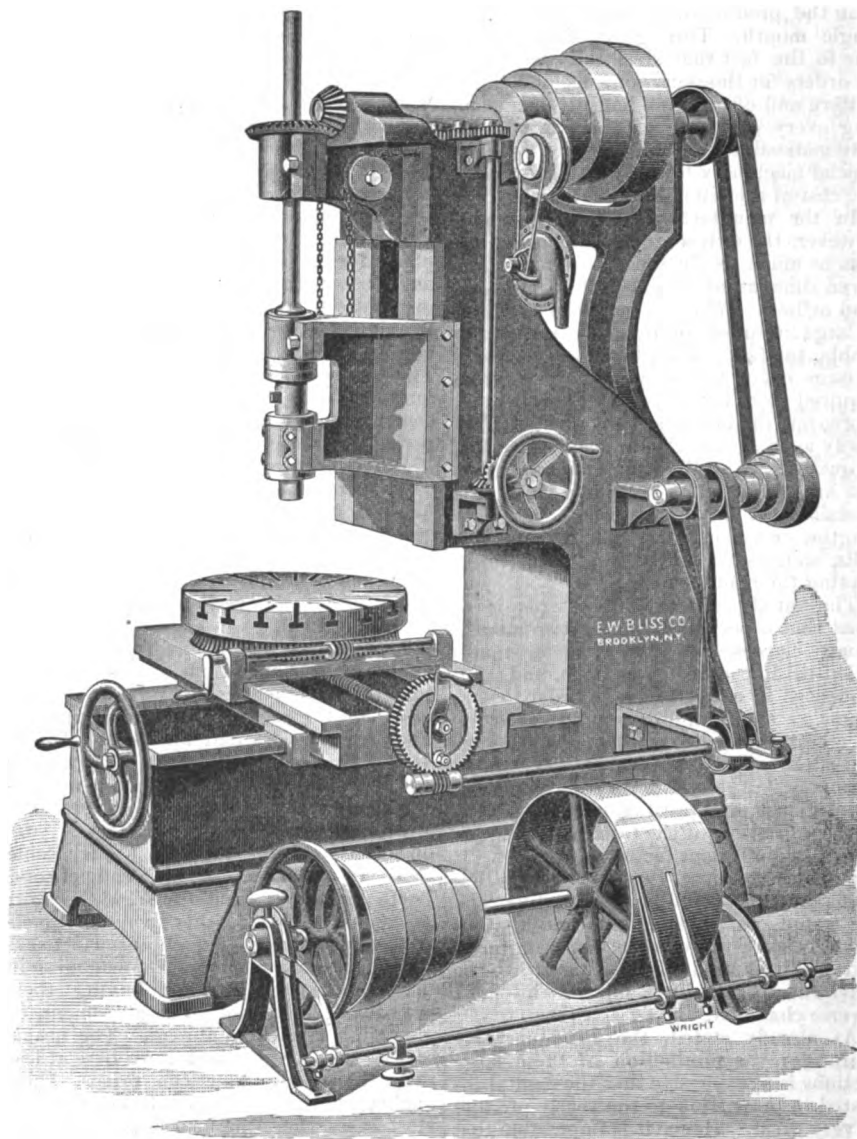
The propelling machinery consists of two of the largest sets of triple-expansion engines afloat. They are of the usual inverted vertical type. The cylinders are 45 in. + 74 in. + 113 in. x 5 ft. stroke. The boiler pressure is 150 pounds. The screws are 22 feet in diameter and 28 feet pitch. They revolve out board, and there is no opening in the dead wood between them. If they worked without slip they would make 218 revolutions to the mile, and at 80 revolutions, which may be taken as the standard speed, the ship would steam at 22 knots. With a slip of about 9 per cent, therefore the speed of the ship would be 20 knots. The engines stand side by side with a longitudinal bulkhead between them. They are in every respect duplicates. A door is provided in the bulkhead opposite the intermediate cranks and the starting platforms are opposite the doorway. The reversing gear is Brown's patent hydraulic. The engines are quite easily started, stopped, or reversed by one engineer on each platform. The engines are wholly of steel and gun metal, save the cylinders. The great "A" frames are splendid castings, each weighing 6 tons—that is, 12 tons for each cylinder. The valves are all pistons—four being fitted to the low-pressure cylinder, two to the intermediate and one to the high-pressure cylinder. The eccentric hoops are cast-steel lined with white metal, as are all the bearings throughout. The valves are disposed in the "corners," so to speak, and the valve-stems are united in pairs by crossheads. They work so smoothly and are so perfectly balanced that the valve gear, which is of the ordinary Stephenson link type, has really very little to do. The surface condensers are horizontal cylinders lying rather high up in the wings. The air pumps are worked by back levers in the usual way. There are no feed pumps on the main engine, the boilers being supplied by five vertical Worthington donkey pumps in each engine room, standing against the forward bulkhead. Two of these pumps will feed the boilers, but the others are for reserve, or for the countless pumping jobs wanted in a big ship. The engines actually employed at any time in feeding the boilers are controlled by an automatic arrangement, a float in the hotwell, rising or falling with the level of the water in the well, and opening or shutting the throttle-valve, an arrangement which is, so far as we are aware, quite new in marine work, and found to answer admirably; the donkey remaining steadily at work instead of tearing away for a few minutes emptying the hotwell, and then having to stand until the well fills again. It would be difficult if not impossible to find more admirable examples of the highest type of mechanical engineering than is supplied by the splendid main engines.

New Vertical Milling Machine.

Milling machines of various designs have, during the last few years, come into more general use than formerly. Much work that was formerly done on the planer or shaper can be done on a suitable milling machine not only better but much more rapidly. It is also a more economical machine from another point of view, as it does not require such skillful and high-priced labor to run it on a large majority of the work done as does a planer or shaping machine. It has, therefore,

hand wheel shown on the side of the machine. A small blower driven from the countershaft by a round belt is attached to the machine, and a flexible pipe is connected with it for the purpose of blowing the chips from the work so that the operator may clearly see and follow the lines marked out on it.

The machine is built in two sizes, the smaller size having a circular table 20 inches in diameter, while that of the larger measures 24 inches, the dimensions of other parts being correspondingly larger. The machine is built by the E. W. Bliss



NEW VERTICAL MILLING MACHINE, BUILT BY THE E. W. BLISS CO. BROOKLYN, N. Y.

come to be considered one of the most efficient of labor-saving machines for general machine shop use.

One of the most recently improved machines of this class we show on this page. It is a very heavy and substantial machine, built with especial reference to convenience of operation. The bed and upright portion are made in one casting and well braced. The upright portion is cored out and provided with shelves and a door, making a convenient tool closet. The table has an automatic cross feed driven by a belt having four changes of speed. Independent circular and longitudinal feeds are also supplied. The cutter spindle is provided with means of vertical and side adjustment not clearly shown in the engraving, and the head which carries the spindle is counterbalanced and is raised and lowered by a screw operated by the

Company, of Brooklyn, N. Y., who have 16 of them in operation in their own works.

Wire-Drawing Plate Blanks.—The Treasury Department has made the following decision in a letter to the Collector of Customs of New York, dated September 18: "Steel-wire drawing-plate blanks which have been forged into the sizes and shapes desired preparatory to their further manufacture and completion for use as 'drawing plates,' but which have not undergone any such further manufacture, are held to be dutiable at the rate of 2½ cents per pound, under the provision in Schedule C (T. L., 167) for 'forgings of * * * steel.'"

The City of Paris, sister ship to the City of New York, is almost ready for launching.

Government Receipts and Expenses.

The Warrant Division of the Treasury Department has published tables showing the receipts and expenditures of the Government in detail since the year 1856. The table of receipts shows that the largest sum ever collected from import duties was for the year ending June 30, 1882, the amount collected that year being \$220,410,730. The nearest approach to these figures prior to the passage of the tariff act of March 3, 1883, was in 1872, when the amount collected was \$216,370,287.

The act of 1883 went into operation on July 1st of that year. The question of reducing rates was under discussion before the Tariff commission and in Congress during the entire year, and naturally had some influence on the volume of importations. Yet the receipts for that year fell less than \$6,000,000 below those for the preceding year. The legitimate effect of the reduction of 1883 is seen in the receipts for the year ending with June 30, 1884, and show a reduction of \$9,600,000 below those for 1883, and over \$25,000,000 below those for 1882. There was a further falling off for the fiscal year 1885, when the receipts dropped to \$181,471,939, a decline of \$39,000,000 compared with 1882, and an excess of \$4,000,000 below the reduction which Judge Kelly estimated would attend the passage of the tariff act of 1883, the full force of that act seems to have been reached in 1885. Business was adjusted to the new rates of duty, and, although Mr. Morrison was putting forth an effort to secure horizontal reduction, this effort does not seem to have been seriously regarded by the commercial community, so far as the customs receipts reveal. For the fiscal year 1886 these receipts advanced to \$192,905,023, nearly \$11,500,000 over those for the preceding year. In 1887 there was a further advance of \$24,000,000 compared with 1886, and the figures for 1888 show \$1,800,000 in excess of the preceding year.

These figures exhibit striking coincidence, and suggest a variety of combinations that may be used efficiently by advocates of the respective sides of the tariff question. Thus, in 1872 the customs receipts reached a higher figure than ever before. In May of that year an act was passed reducing rates, which went into operation July 1. Following this reduction in rates, we find a falling off in custom receipts of \$28,000,000. The reduction steadily continued for the six years following the passage of the act, until they fell for the year, ending with June, 1878, to \$130,670,680, a decline of \$86,000,000, compared with the fiscal year 1872, the year preceding the reduction in duties. The year 1879 shows an increase of \$7,000,000. The following year the receipts rose to \$186,522,064; for 1880 they were over \$198,000,000; and for 1882, as previously stated, \$220,410,730, the highest point ever reached.

The act of 1883 is in like manner marked by decline and subsequent advances in receipts. The tariff reform advocates claim that the act of 1883 did not reduce the revenue. This is true, as may be seen by the Treasury figures. The protectionists claim that reduction of rates is not calculated to reduce, but to increase the revenue by increasing the volume of importations. This is also true, as may be seen by the Treasury figures for the years immediately following the reduction in 1872, when, among other reductions, \$13,000,000 per annum was stricken from tea and coffee, as well as for the years since the passage of the act of March, 1883. This is one of those cases where the same figures can be used to prove both sides.

To get the full force of these figures the appended table will prove useful. In it the receipts under the acts of 1882 and 1883 are arranged in parallel columns, starting

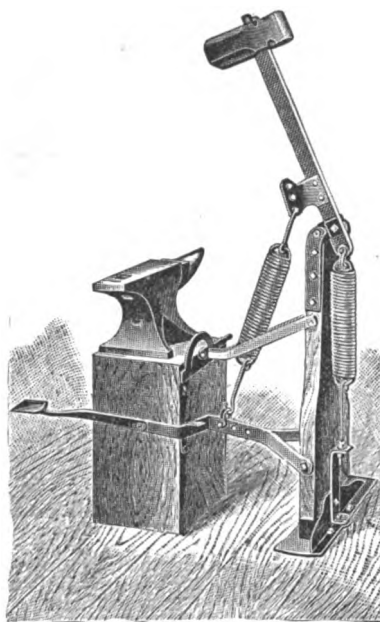
in each case with the receipts for the year immediately preceding the respective periods:

Act of 1872.		Act of 1883.	
1872.....	\$216,370,287	1882.....	\$220,410,730
1873.....	188,089,523	1883.....	214,706,497
1874.....	163,103,834	1884.....	195,067,490
1875.....	157,167,722	1885.....	181,471,939
1876.....	148,071,985	1886.....	192,905,023
1877.....	130,956,493	1887.....	217,286,893
1878.....	130,170,680	1888.....	219,091,173
1879.....	137,250,048		
1880.....	186,522,065		
1881.....	198,159,876		
1882.....	220,410,730		

It will be seen that in both cases the effect of legislation reducing rates of duty was to ultimately increase the aggregate revenue, and this increase is unquestionably attributable to an increase in the quantities of merchandise imported, as will be seen from an examination of the annual reports of the Bureau of Statistics.

A New Blacksmith's Hammer.

The Ready Striker Hammer Company, of Longmont, Col., are bringing out a new



The Ready Striker Hammer for Blacksmiths.

form of hammer, which is specially designed for blacksmiths' use. The engraving which we annex explains its arrangement. It can be attached to any anvil block, and, by one motion of a lever, will shift the hammer to strike from the center of the anvil to the fuller or *vice versa*. The power applied by the foot operates it easily and rapidly, striking either light or heavy at the will of the operator. The two tempered steel coil springs attached to the handle on each side of the axle impart elasticity to the hammer, enabling the operator, it is claimed, to perform more and better work than is possible with the hand striker, and with a considerable saving.

The Viceroy of Canton, in a letter to the Emperor, declares that kerosene oil is responsible for nine-tenths of all the fires in the empire, and remarks that if America "can prohibit our going there because labor is injurious to their interests, we have an equal right to prohibit the importation of kerosene when it is injurious to us."

Immigration at the ports in the United States for August numbered 35,812, against 37,308 for the corresponding month last year. Germany contributed 8427, England and Wales 6608, Ireland 4441, and Scandinavia 4000.

The Wheeling Steel Works.

The Wheeling Steel Works, at Benwood, near Wheeling, W. Va., were built in 1886 to supply three of the nail mills of the Wheeling district with slabs for nail manufacture. The general arrangement of the plant was on the lines first developed by Mr. Robert Forsyth, of the Union Steel Company, Chicago, the principal feature of which is the transfer of the casting operations into a special pit. The two converters, which usually blow 12,000 pounds of metal, are placed side by side in front of a pit, commanded by a central crane. The latter has a telescopic arrangement by which it receives the iron car, into which the iron is run from the three 8-foot cupolas, placed along the outside of the pit. In this manner the converters are entirely free from all encumbrances in the form of runners, &c. The same central crane receives the steel ladle, from which, by the same telescopic arrangement, it is pushed along a short track, which connects the converter-pit with the ingot-pit, the latter being commanded by a central crane. The plan at Wheeling provided for a possible addition of two more converters, so that the two now in are placed on one side of the center line of the building.

The iron as it comes from the cupolas carries about 1.4 per cent. of silicon, and the steel produced contains from 0.05 to 0.08 of carbon and about 0.35 per cent. of manganese, the ferromanganese being preheated. The ingots for slabs run about 4000 pounds, and those for billets 3000 pounds, the maximum output per day having been about 4500 tons, while the weekly average is 2000 tons of soft steel. The ingots are placed upon trucks, and are switched by a locomotive on the track which puts them within the range of the heating furnace cranes. The reheating is done in two pits, with three holes each for four ingots. The company have been forced to return to the use of producer gas for all purposes, except drying ladles and bottoms. Like the other manufacturing establishments of Wheeling, who were the first to give the two natural gas companies encouragement, they have found themselves promptly sacrificed to the demands of domestic consumers on the first signs of shortage. It has been a matter of frequent occurrence, especially in the winter, to have the supply curtailed, and at times entirely cut off. The Wheeling Steel Company have, therefore, for some time past, given up the use of natural gas except for the purposes named.

The reheated ingots are carried by a buggy to the blooming mill, a 36-inch MacKintosh, Hemphill & Co. mill with tables, driven by a 40 x 48 inch Southwark reversing engine having a piston speed of 1200 feet on ordinary work. The billets and slabs are sheared by a shear built by the Morgan Engineering Company, of Alliance, Ohio, which has a capacity of 120 square inches. The shear is located close to the end of the building, the slabs or billets being delivered outside of it upon cars standing on a track. They are pushed under a spray of water and switched back to a point where they are loaded on railroad cars.

Blast is furnished for the works by an E. P. Allis engine having a 36-inch steam and a 48-inch blowing cylinder and a 5-foot stroke. The engine is of special design with fly-wheel and rocker and is pronounced by John E. Fry, the general manager of the works, a particularly efficient piece of machinery.

A Swedish engineer, M. Lundberg, says a foreign exchange, has constructed a railway car, which, in a few minutes, may be adapted to five different gauges, the narrowest being 0.890 m. The invention has been patented in several foreign countries.

The New York Subways.

At the recent convention in this city of the Telephone Exchange Association, Mr. L. F. Beckwith, of the New York Subway Construction Company, gave some interesting facts on the New York subways. He said that, with the exception of the Edison, they are all built on the "drawing-in" system, being groups of ducts extending between a series of manholes. He believed experience had shown that a main conduit of separate pipes that may be crowded or curved or kept apart is best adapted to overcome the many obstacles met with in the ground. Screw-jointed, asphalted wrought-iron pipes, laid preferably in hydraulic cement concrete, give most tightness of duct against gas and water with greatest strength. The cement-pipe and creosoted wood tubes have also some valuable features. In some places they had met a steam-heating company's pipes and had great difficulties because of them, the steam constantly escaping, and, therefore, not permitting the use of materials of construction melting or softening at from 160° to 200° F. Non-metallic and metallic ducts 5 miles long have been purposely constructed, that the telephone people may have a chance to experiment as to their influence on low tension currents. The work done up to the 1st of the present month is here given:

Dorsett ducts, coal tar concrete, feet.....	235,837
Zinc tubes laid in hyd. cement concrete, feet.....	68,883
Creosoted wood tubes, feet.....	167,175
Cement pipe laid in hyd. cement concrete, feet.....	216,626
Iron pipe laid in asphaltic concrete, feet.....	131,284
Iron pipe laid in hyd. cement concrete, feet.....	1,423,722
Iron distributing pipe, feet.....	23,301
Edison iron tubes, feet.....	222,794
Grand total length of single duct, feet.....	2,489,602
Grand total length of single duct, miles.....	472
Grand total length of trench, miles.....	37
Number of manholes.....	523
Total length telephone and telegraph ducts, miles.....	376
Total length electric light ducts, miles.....	96
Length of telephone and telegraph trenches, miles.....	19½
Length of special electric light trenches, miles.....	17½

About 750,000 feet of single duct for telephone, telegraph and electric-light purposes authorized by the Board of Electrical Control remain to be built. For telegraph purposes an iron pipe from a man-hole connects underground with a building or with the foot of a pole. For telephone purposes the above method is used, and a pipe runs up the face of a building to the roof, where from a fixture the cable is divided for distribution on the block and surrounding blocks. Sometimes the pipe is carried up through an elevator or ventilating shaft. In the down-town district and along Broadway to Union Square an iron 8-inch pipe is laid in the trench above the subway, provided at intervals of about 50 feet with malleable-iron circular distributing or service boxes with screw covers 12 inches in diameter, with side outlets through which a cable can be conducted by a service-pipe into the buildings.

For electric light distribution the Edison Company have their special system laid. A cast-iron distributing conduit with six ducts and flush boxes has been authorized to be laid in Broadway from Fourteenth street to Thirty-fifth street. Up to August 27, 1888, there were 3567 miles of wire laid in the subways by the Metropolitan Telephone and Telegraph Company, and 100 wire lead-covered cable from Whitehall street to Fifty-eighth street, about 6 miles, and the longest of this size in exist-

ence under ground. The Western Union Company have about 100 miles of wire underground, and the Edison about 126. The Brush Company are putting an eight-conductor cable in the Broadway conduit from Fourteenth street to Thirty-fifth street, making 8 miles of electric arc light wire.

A Copper Producer on the Syndicate.

Joseph W. Clark and A. S. Bigelow have affixed their signatures, as president and treasurer, to the annual report of the Tamarack Mining Company. Their remarks on the position of the syndicate are interesting as reflecting the views of the producers. We quote the following passages:

It is evident that it is of almost vital importance to the entire copper producing interest of this country that the utmost harmony should exist in handling the rapidly increasing product of our mines. Our recent sale of 50,000,000 pounds to the Société Industrielle and Commerciale des Métaux, was the first of the great sales made by our mines to the French company, and, followed by the larger transaction of 100,000,000 pounds by the Montana company, with which we are intimately connected, enabled us in a good degree to promote, if not direct, these enormous operations. Transactions of such magnitude had, up to that time, never been recorded on the metal exchanges of this country or Europe. As we anticipated, they led directly to the consolidation and control of the product of all the great mines of the world. The inauguration of this most comprehensive system of mutual oversight, control of the product, and manipulation of these products, seems to us almost vital to their well being. The stimulus of present prices will necessarily lead all parties to crowd to their utmost all their energies in the line of production, and if this output is thrown upon the market without control it will surely result in disaster, while under the present ownership and management, it will not be difficult to compel an equitable distribution. With this ultimate object in view, the policy of the recent organization of the western sulphuret mines has been largely shaped.

It is hoped that these points, which must have prominence in the early future, will not be lost sight of. Very much has been said in the public prints about the falling off of consumption since the rapid advance in price last year, caused chiefly, it is alleged, by the operations of what is called the "French syndicate." We doubt if these statements and impressions are correct, for, although the statistics of the world's production and consumption of copper may be tolerably well in hand, we are well assured that great error and misconception prevails with the public in these matters. For instance: the statement that the consumption of rolled or sheet copper has been greatly checked by this advance is an error, for the best of reasons, that no such advance has been made. The price of rolled copper has, for a long time, been fixed by an association of the rolling mills, and fluctuations are rare where the statistics are fully discussed and conclusions reached in view of supply and demand. At no time has the price of sheet copper had a market price at all to be compared with ingot, when it was forced to the abnormal price of 10 cents, as it was last year. These facts hold also with other special brands of manufactured copper.

Another still more important error prevails with regard to the normal price of copper for the past ten or more years. It has been held up to the public that the unholy operations of the French syndicate have forced the normal price of copper from the low figure of 10 cents to the present price of 16½, and thereby checked the consumption to an alarming degree. When looked at from a producer's standpoint, the real facts, as proved by actual sales of one of our large mining companies, show for 15 consecutive years that sales have averaged over 15 cents.

We have pleasure in stating our growing confidence in the stability and integrity of the syndicate. We have done what we could by the way of inquiry, and we have no hesitation in saying that our mature judgment has the unqualified approval of our policy in the sale of our entire product for three years. The financial backing of this concern is enormous, and, so far as we are concerned, there would seem to be nothing wanting. The security of our credit is ample and perfect.

It is probable that the company to which reference is made in the report quoted above is the Osceola. We append

below a copy of the record of their sales and the prices realized:

Sales of Copper and Average Prices by the Osceola Mining Company, 1874 to 1887.

Years.	Sales. Pounds.	Average price. Cts. per pound.	Years.	Sales. Pounds.	Average price. Cts. per pound.
1874....	936,002	23.37	1881....	4,176,976	17.77
1875....	1,330,813	22.77	1882....	4,179,782	17.70
1876....	1,693,737	20.57	1883....	4,256,409	14.98
1877....	2,774,777	18.19	1884....	4,247,620	12.82
1878....	2,705,998	15.53	1885....	1,639,169	10.75
1879....	3,197,387	17.79	1886....	3,560,796	10.51
1880....	3,381,061	19.15	1887....	3,583,723	11.86

It is time that these sales for a period of 14 years show an average of 16.77 cents, though it is probable that the Osceola did better than the average, because it was never in the export pool. Yet the Tamarack report itself contains a refutation of the argument for present prices. The company produced 10,389,867 pounds of ingot copper in the fiscal year from 144,412 tons of rock stamped, yielding 3.6 per cent. of copper at a cost of 5.75 cents laid down in New York, sold, selling the copper at an average of 13.95 cents. The pluck of those who sunk a shaft over 2000 feet deep on the chance of finding the Calumet and Hecla conglomerate in depth undoubtedly deserves ample rewards. The company paid \$330,000 for its territory, and spent \$497,806.37 for construction and development, assuming that additional sums are necessary to carry the capital expenditures to \$1,000,000. Granting 25 per cent. per annum as an ample profit on a mining venture—a profit of \$250,000 per annum on an output of 15,000,000 pounds—which the plant is capable of handling, this profit would represent less than 1.75 cents per pound. In other words, with copper at 7.5 cents per pound, the Tamarack Company would be making 25 per cent. on an investment of \$1,000,000.

Another fact is not taken into account by those who point to averages of selling prices over a series of years to justify present prices, and that is the decline in the cost of production. We may cite the Quincy mine. In 1875 its cost was 15.79 cents a pound. In 1881 it had dropped to 10.03 cents, and in 1886 to 6.78 cents. Similar figures could be adduced for other mines. They are the results of the introduction of high explosives and rock-drills in mining, of improvements in transportation, machinery, stamping and dressing, of lowering of supplies and fuel. It is, therefore, unfair and misleading to quote averages over such a period of progress to support claims for high prices now.

Speculation in the Argentine Republic has broken out afresh, advices from Buenos Ayres to September 1 say: "The gold premium has begun to fall steadily, chiefly owing to the very large amounts of specie that arrive by every packet from England. It is calculated that 40,000,000 gold dollars will be the sum total of the influx of specie during the second half of this year, and with such an avalanche of the precious metal the premium must necessarily fall headlong. The whole market is now on the incline and the premium is expected to fall to 30 per cent. next month. These large gold remittances from Europe find their direct cause in Minister Pacheco's Free Banking Act, which has revolutionized the financial system of all the interior provinces. All the local Governments are in a hurry to avail themselves of the advantages of the act to start national banks in their respective provinces, and hence the motley array of loans of Argentine States in the London and Paris markets."

By the bursting of a reservoir across a ravine near Valparaiso many lives were lost, and property valued at \$3,000,000 was destroyed.

The Goulds Hydraulic Test Pumps.

The Goulds Mfg. Company, of Seneca Falls, N. Y., are putting on the market a number of newly designed hydraulic test pumps, of which we present engravings on this page.

Fig. 1 represents a gun-metal pump for testing boilers, tanks, pipes, &c., to 1000 pounds pressure per square inch, if necessary. As the cistern only holds about 2 gallons of water, the thing to be tested should first be filled by other means, and the tester then applied to supply the balance and work up the pressure. The weight of the pump is about 40 pounds. Fig. 2 shows the same design of pump mounted on a strong wood barrow with a cast-iron tank underneath for portable use in the many services which these pumps can perform. This combination is one of great utility.

In Fig. 3 we show a third design. This pump has a revolving top, admitting its being worked in any position, and a sectional lever, which can be changed to give greatest leverage. The suction and discharge valves (flanged and bolted to cylinder) are of a new and improved type, with brass valve seats, poppets and caps. The pump should be placed within short suction distance of water, or on a level

of cable now under ground in Brooklyn is 11,800 feet, between the Bedford and Williamsburgh offices, of 100 wires, twisted in pairs, the pairs broken up at all the splices, conductors 0.035, insulated to 0.075. The insulation of this cable is 39 megohms per mile; capacity, 26 microfarads; resistance of the construction, 47 ohms per mile. The electrical qualities of this 2 miles cable are: Insulation, 50 megohms; capacity, 52 microfarads, resistance of conductors, 94 ohms. There have been and still are many complaints of the im-

the 30 years of her existence the Great Eastern was successfully beached near New Ferry, on the Cheshire shore of the Mersey, England, on August 25.

The Canadian Northwest Territories.

By act of October 7, 1876, the territories formerly known as Rupert's Land and the Northwestern Territory, with the exception of Manitoba, were created into a government by the Canadian Parliament. The territories were divided, in 1882, into four districts—viz., Assiniboia, Saskatchewan, Alberta and Athabasca. Regina, the capital, is in the district of Assiniboia. Free grants of land of 160 acres can be obtained. It is estimated that the territories have over 150,000,000 acres of land suit-

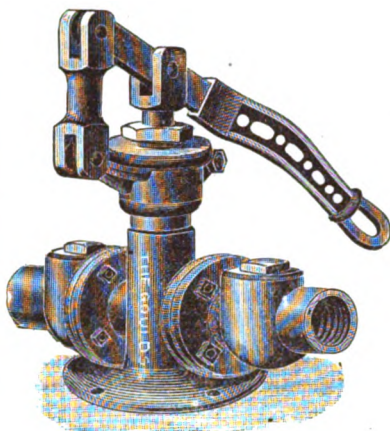


Fig. 3.—Pump with Revolving Top.

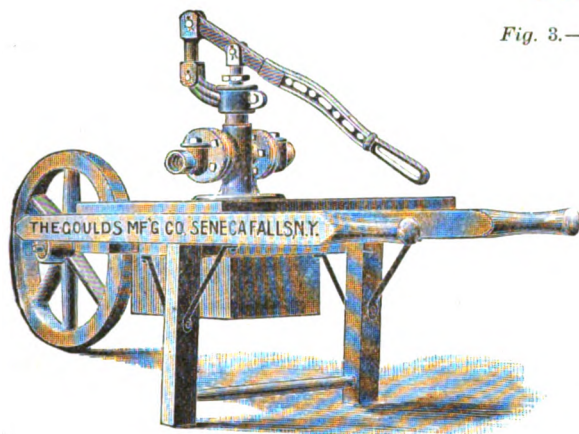


Fig. 2.—Test Pump on Barrow with Tank.

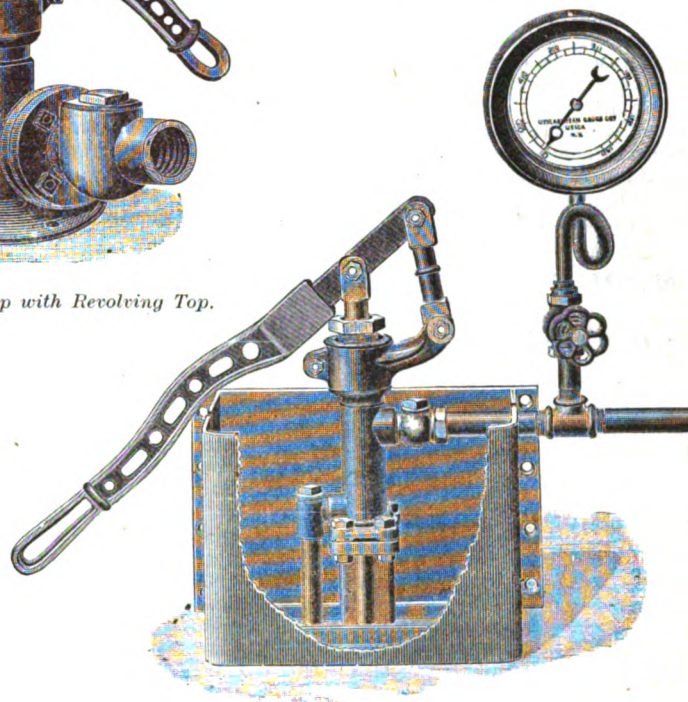


Fig. 1.—Test Pump with Tank.

IMPROVED HYDRAULIC TEST PUMPS, BUILT BY THE GOULDS MFG. COMPANY, SENECA FALLS, N. Y.

with it, and will be found invaluable to the boiler-maker or user for testing the condition of boilers, vessels, &c., as for cleaning out pipes, &c., &c. It will generate a cold-water pressure of 500 pounds per square inch.

The Brooklyn Subways.

Mr. W. D. Sargent, engaged in constructing the Brooklyn subways, has contributed to the proceedings of the Telephone Exchange Association a paper on the subject, which was presented at the recent New York meeting. He says the first section of the creosoted wooden conduits, which have been used four years, do not show any evidences of decay, the ducts remaining clean and dry, and the cables drawing in and out easily. Three-inch ducts he thinks the best. Of the cables laid four years ago, those covered with pure lead have been more than half eaten through. One just drawn out, and only two years buried, is badly corroded. Those with a mixture of tin show only slight corrosion. He thinks that if, in addition to the tin, cables were drawn through a bath of gas tar or asphaltum, then covered with a good stout braid, and again run through the bath, they would be practically imperishable. The greatest length

perfect working of this cable, but he is inclined to attribute the trouble to other causes rather than inefficiency on the part of the cable itself. The Dorsett conduit, of which much was expected, he says, has proved very unsatisfactory. They have 5 miles of it, with ducts 2 inches in diameter, and these, because of irregularities at the joints, will only permit of a cable 1½ inches in diameter being drawn in.

As the mileage of underground wire increases, the obstacles in the way of good service will be increased. The actual extent of the Brooklyn underground wires was on September 10:

	Miles.
Length of conduit.....	15.17
Length of duct.....	105.5
Length of cable.....	22.93
Length of conductor.....	2,053.3

Nineteen hundred and thirteen subscribers are using underground wires, the length of the latter being 1229.9 miles.

Although there are still some persons who believe—and perhaps the wish is father to the thought—that the great vessel designed by Brunel will not come to such an inglorious end, there is very little doubt that she will be broken up and her fragments sold as old iron. After having passed through so many vicissitudes for

able for cultivation and awaiting settlement. The total area of that part of the Dominion exceeds 1,250,000 square miles, but in this area of the Great Mackenzie Basin are not included any of the islands of the Arctic Archipelago. The coast line on the Arctic Ocean and Hudson's Bay, exclusive of inlets, is 5000 miles long. Over one-half of this coast line is accessible to whaling and sealing craft.

The total area of the lakes probably exceeds that of the Eastern Canadian-American chain and the navigable coast line of the larger lakes of the region is about 4000 miles. There is river navigation in the region to the extent of 2750 miles, half of which is suitable for stern-wheel steamers, which, with barges, may carry 300 tons; the other half is deep enough for light draft seagoing steamers. A total of 6500 miles of continuous lake and river navigation is broken in two places. One of these occurs on the Great Slave River, and to overcome it a 20-mile wagon road is now under construction from Fort Smith southward. The other break consists of 70 miles of the Athabasca River, above Fort McMurray. In these 70 miles rapids are unpleasantly numerous; flat boats can descend, but cannot ascend them.

The immense lacustrine area of the northern and eastern portions of the terri-

tory implies the future supply of a great part of the North American continent with food fish. Salmon are found in four of the rivers which empty into Hudson's Bay on the western shore, and in all of the rivers flowing into the Arctic Ocean, except the Mackenzie, in which the "inconnu" exists in great numbers. The presence of the capeling on the coasts of the Arctic Ocean and Hudson's Bay is supposed to imply the presence of the cod on these shores. In the great Mackenzie Basin there is believed to be a possible area fitted for the growth of potatoes of 650,000 square miles; suitable for barley, 407,000 square miles, and suitable for wheat, 316,000 square miles. The pastoral area is placed at 860,000 square miles, of which 26,000 are open prairie. Including the latter, 274,000 square miles may be considered arable. Of the total area, 400,000 square miles are useless for the pasturage of domestic animals or for cultivation. The forest area contains the liard, a balsam poplar, which attains a growth of 120 feet in height and a stump diameter of 6 feet; the white spruce, 150 feet high, with a stump diameter of 5 feet; the larch, of about the same size, and the banksian pine, which has a straight stem 100 feet high, with a stump diameter of only 2 feet.

NEW PUBLICATIONS.

POOR'S MANUAL OF RAILROADS, 1888. By Henry V. Poor. Published by H. V. & H. W. Poor, 70 Wall street, New York.

Poor's well-known manual has been again issued with all its leading features, to which has been added a directory of railway officials. We may quote the following figures from Mr. Poor's usual summary, since they convey an idea of the magnitude of railroad interests:

	Miles.
Length of track laid up to December 31, 1887.....	149,912.70
Of which were completed up to the close of the fiscal years of the respective companies.....	147,998.60
Completed since close of their fiscal years.....	1,914.10
Increase of mileage in the calendar year 1887 (9.6 p. c.).....	13,080.75
Increase of mileage in the fiscal year 1887 (9.7 p. c.).....	14,392.04
Liabilities and Assets of the Companies owning the above 147,998.60 Miles of Line.	
Liabilities.	
Capital stock.....	\$4,191,562,020
Funded debt.....	4,186,943,116
Unfunded debt.....	294,682,071
Current debt.....	223,243,998
Total liabilities.....	\$8,896,431,214
Assets.	
Cost R. R. and equipment.....	\$7,799,471,835
Real estate, stocks, bonds and other investments.....	984,975,945
Cash, bills receivable, current accounts, &c.....	415,506,735
Total assets.....	\$9,199,954,515
Excess of assets over liabilities.....	\$303,523,301
Excess of assets in various States.....	\$441,410,306
Excess of liabilities in various States.....	137,887,005
	\$303,523,301
Miles.	
Total mileage of railroads completed at close of fiscal years.....	147,998.60
Of which full statistics of operations were received from.....	136,956.49
Mileage of roads not reporting earnings, &c., consisting chiefly of new roads not yet brought into full operation.....	11,012.11
In 1887 the greater portion of the new mileage was built in the last six months of the year, and consequently had not been brought into operation until the year 1888.	
Miles operated.....	136,986.49
Passenger train mileage.....	238,755,920
Freight train mileage.....	394,191,107
Mixed train mileage.....	11,031,869
Total train mileage.....	643,978,896

Passengers carried.....	428,225,513
Passengers--Mileage.....	10,570,306,710
Tons moved.....	552,074,752
Tons one mile.....	60,061,099,996
Earnings.—Passengers.....	\$240,542,876
Freight.....	636,666,223
Other.....	54,176,055

Total.....	\$931,385,154
Operating expenses.....	600,249,478

Net earnings.....	\$331,135,676
Other receipts, including rentals received by lessor companies..	83,164,355

Total available revenue.....	\$414,300,031
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Payments from Available Revenue:	
Interest on bonds.....	\$195,418,710
Other interest.....	6,500,200
Dividends.....	90,613,458
Rental.....	42,042,277
Miscellaneous.....	41,168,903
	\$375,233,548

Balance—Excess of available revenue over actual payments therefrom for the year..	\$39,066,483
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One of the most valuable compilations of the present volume is that with reference to the average rates of freights per ton per mile for each year. As it would be impossible to make a fair comparison of the average rates of all the roads, two representative groups have been selected for this purpose. The Eastern group embraces the Pennsylvania, Pittsburgh and Fort Wayne, New York Central, Lake Shore, Michigan Central, Boston and Albany and Erie. The Western group embraces the Chicago and Alton, the Burlington and Quincy, the St. Paul, the Northwestern, the Rock Island and the Illinois Central. The tables of the aggregate tonnage carried 1 mile by these two groups show that in the 20 years from 1865 to 1885 the average rates of freight were reduced to about one-quarter of what they were in 1865. On the Eastern group the rate per ton per mile was reduced from 2.900 cents to 0.636 cents, with an advance to 0.718 cents in 1887 on the roads running east from Chicago. On the roads west from Chicago the rate was reduced from 3.642 cents in 1865 to 1.014 cents in 1887. During the same time there was an increase in the aggregate freight carried per ton per mile from 1,639,316,859 tons in 1865 to 13,543,351,451 in 1887 on the Eastern system, and from 513,421,459 in 1865 to 7,776,436,486 in 1887 on the Western system. The following shows the tons carried 1 mile and the rate per ton per mile on each system for each of the 23 years, ending with 1887:

Year.	—Eastern system.—		—West. system.—	
	Aggregate tons—miles.	Rate pr. tn. pr. mi.	Aggregate.	Rate per mile.
1865.....	1,649,216,859	2.900	513,421,459	3.642
1866.....	2,044,416,231	2.503	576,888,638	3.459
1867.....	2,258,216,174	2.305	768,171,050	3.175
1868.....	2,541,578,620	2.132	889,850,974	3.151
1869.....	3,150,532,219	1.880	1,054,559,835	3.026
1870.....	3,686,324,803	1.598	1,234,078,231	2.423
1871.....	4,240,131,068	1.478	1,333,068,056	2.509
1872.....	5,081,233,127	1.504	1,537,068,063	2.324
1873.....	5,762,062,724	1.476	1,719,490,690	2.188
1874.....	5,879,662,649	1.392	1,851,045,825	2.160
1875.....	5,935,242,397	1.161	1,904,937,377	1.979
1876.....	6,756,527,502	.985	1,994,712,255	1.877
1877.....	6,596,997,523	.971	2,211,021,475	1.604
1878.....	7,855,222,593	.908	2,822,885,896	1.476
1879.....	9,594,719,003	.764	3,470,822,877	1.279
1880.....	10,313,056,759	.909	4,107,610,830	1.389
1881.....	11,560,001,888	.763	4,498,641,431	1.405
1882.....	11,191,066,104	.756	5,040,239,962	1.364
1883.....	11,326,271,886	.829	5,768,109,279	1.310
1884.....	10,719,521,813	.740	6,093,282,749	1.220
1885.....	11,331,309,298	.696	6,500,185,261	1.158
1886.....	11,915,436,513	.711	6,806,148,918	1.111
1887.....	13,543,351,451	.718	7,776,436,486	1.014

The statement of gross and net earnings per mile, as affected by this steady reduction of rates, does not extend further back than 1884, but it shows at least that in the three years 1884-87 there was an increase in the net earnings per mile, notwithstanding the reduction of rates. The gross earnings per mile on all the railroads in the United States declined from \$6663 in 1884 to \$6265 in 1885, increased to

\$6570 in 1886 and \$6861 in 1887. Net earnings per mile decreased from \$2318 in 1884 to \$2185 in 1885, increased to \$2376 in 1886 and \$2444 in 1887, showing that notwithstanding the reduction in rates from 1884, the heavier tonnage more than made good any losses from that source. The increase of net earnings per mile in 1887 over 1884 was \$126, or 5.43 per cent. concurrent with a reduction of about 8 per cent. on the average rates on the Eastern roads, and about 17 per cent. on the Western roads.

The Senate Finance Committee's Tariff Bill.

[By Telegraph from our Washington Correspondent.]

The Senate Committee on Finance, having completed their substitute for the House bill to reduce taxation and simplify laws in relation to the collection of the revenue, reported it to the Senate today.

It strikes out all after the enacting clause and inserts 162 pages of new matter, beginning with tobacco, imposing a special tax of \$3 a year on manufacturers of cigars, and otherwise modifying and repealing certain internal revenue taxes.

It then takes up the import schedules, making more or less modification, observing the theory of protection throughout.

Iron ore remains at 75 cents a ton, with no deduction on account of moisture chemically or physically combined with it.

Iron in pigs, iron kentledge, spiegel-eisen, wrought and scrap iron and scrap steel, three-tenths of 1 cent, but nothing shall be deemed scrap iron or scrap steel except waste in actual use and only fit to be manufactured.

Railway bars made of iron and steel, seven-tenths of 1 cent a pound.

Hoop iron or steel duties are regulated so that when cut to lengths for baling it shall pay two-tenths of 1 per cent. per pound more than the ordinary material.

In sheets of iron it is provided that all common or black sheet iron or steel not thinner than No. 10 wire gauge shall pay duty as plate iron or steel.

Wire rods smaller than No. 6 wire gauge shall be dutiable as wire.

Steel ingots and steel in forms not enumerated shall pay from $\frac{1}{10}$ cent to $3\frac{1}{4}$ cents a pound, [remainder of sentence indistinct in telegram].

All metal produced from iron or its ores by the various modern processes of making steel is denominated steel.

The metal schedule embraces 79 paragraphs, which are more an adjustment of duties, application of modern commercial terms and unification than a change of rates.

The Senate Committee have omitted tin plate from the bill to await information from the New York Custom House. An amendment placing a protective duty of $2\frac{1}{10}$ cents a pound will be introduced pending the debate.

THE WEEK.

An inventor named W. C. Wren, residing in Brooklyn, was suffocated by gas in his bed-chamber. After experimenting for years to discover an improved process of making gas from petroleum he invented a machine, the patent for which he sold for \$100,000. Members of the family say that nearly all this sum was expended in defending his rights in the courts. He was also the inventor of a machine for making ice.

The State Railroad Commission propose the adoption of a uniform steam-coupler, in order to obviate the chief difficulty encountered in the attempt to introduce steam-heating apparatus in railway cars, and invite all interested to attend a conference at Albany, October 16.

Great excitement was caused among members of the Produce Exchange on Monday by rumors that the Gratuity Fund of the Exchange had suffered from frauds similar to those recently committed by James E. Bedell. After investigation, the Register of New York discovered fraudulent mortgages to an aggregate of \$215,000. Thereupon orders were issued for the arrest of Wm. R. Foster, Jr., for many years counsel for the Produce Exchange and for the Gratuity Fund since its inception, six years ago. The manner in which Mr. Foster enriched himself was by pretending to loan the money upon mortgages, which were in reality forged, and was precisely the same method as that described lately in connection with the Bedell forgeries. The Gratuity Fund had on hand, when the last report was made, a surplus of \$1,138,573.96, so that it will not be greatly embarrassed by its present losses. Whether Foster has spent the money or invested it for his own profit is a matter of speculation. He is a man of 45 years of age, and unmarried, and was not known to have any vices or extravagant habits.

Professor Pitt claims to have discovered a cheap process of desulphurizing the heavy oils of Ohio, which converts ordinary crude petroleum into a "water white," and burns as well as the best refined. An almost worthless substance is thus made valuable.

A combination has been made between the firm of Lombard & Ayres, of New York, and the Ocean Oil Company and the Chester Oil Company, of Philadelphia, by which the latter companies purchase the refineries of Lombard & Ayres at Bayonne, N. J. The price is said to be about \$2,000,000. Lombard & Ayres were the largest individual refiners in the country. The result will be the removal of the Tidewater Pipe Line Company's headquarters to New York City, as that company control the Chester and Ocean refineries. The Tidewater pipe lines run from the upper oil region to Bayonne, and the Ocean Company's works are at the latter place also. The Chester Company's plant will also be removed to Bayonne.

Work will soon commence on the new armory near Ninth avenue and Sixty-seventh street, for the Twenty-second Regiment. The structure will cost \$300,000.

A sensation was caused on the New York Produce Exchange by the sudden death on Saturday of Abram S. Jewell, one of its best known members and twice a highly esteemed president.

The tools used by Japanese farmers are described by one who recently witnessed the processes of rice culture. Bullocks drawing long-toothed harrows were engaged in tearing up the old stubble. Wooden plows were also at work, mere

stirring-up implements of wood, with one handle. They had a rounded nose, fortified with an iron chisel, point beveled downward. Then there was a rude plow with broad iron share for turning a shallow furrow and heavy oblong hoes for working the soil over and over. Grading scoops completed the ground utensils, but for shaping the causeways or narrow dykes between the fields the coolies used the usual hand weapons. A little Yankee ingenuity would soon introduce marvelous changes in these ancient methods.

The proposed bridge across the Hudson at Anthony's Nose is again coming into prominence, as a consequence of the now assured success of the bridge at Poughkeepsie. At the point selected for crossing, just above Peekskill, the river narrows down to a width that permits of a single span reaching from shore to shore. The plans contemplate a structure modeled after the great Brooklyn Bridge, but with a single span 3000 feet long, 195 feet above high water mark and suspended from steel towers 320 feet high and resting on natural granite foundations. Gen. Edward W. Serrell, civil engineer and president of the Highland Bridge Company, is authority for the statement that the enterprise is backed by abundant capital, and it is expected to complete the structure ready for traffic within two years. General Serrell claims important advantages for a bridge at Peekskill, as compared with the one at Poughkeepsie, in its proximity to New York city and in the shorter line of transportation offered between New England and the Pennsylvania coal and iron mining regions.

Respecting business in the Canadian province of Quebec, Mayor Latallier, of the city of Quebec, takes a rather desponding view. He is reported as saying that the province is not advancing: "The enterprise of Quebec is shown by the French-Canadian population, and through the manufacture of boots and shoes and several other industries of the St. Roch and St. John suburbs we keep our heads above water. Throughout the province, I regret to say, the present tendency is to fall back. Montreal is not advancing. She may be barely holding her own, but that is all. I refer to her commercial growth. The rural communities are losing. Emigration to the States, where the young men do well, is sapping the life-blood of the province. The Northwestern emigration is also carrying away the agriculturists, but it is to the States that the exodus is the strongest in its tide. Every young man who prospers across the border is an agent of emigration. He fills the mind of his brothers and sisters, even of his old father, with discontent with the farm and home life. Young men will go to New England and take up farms abandoned by their American owners, and will, under the existing conditions, prosper on them."

It is affirmed of the Melbourne Exhibition that it is a great success.

Peter Bergstrom, proprietor of an iron foundry at 179 Plymouth street, Brooklyn, was testing a new boiler on Friday when it exploded. His face and head were badly torn by the flying metal, and he died before he could be removed to the hospital.

Engineers appointed by the Government have selected a site for a dry dock at League Island navy yard. The dock will be 500 feet long and cost about \$500,000.

Canada has an ad valorem tariff, and complains of undervaluations of the imports from the United States. Our Bureau of Statistics makes the total of our exports to Canada in 1887 \$33,495,408 of domestic merchandise and \$2,666,944 of foreign merchandise. The Canadian authorities appraised the value of imports from the

United States during that year at \$44,802,732. This indicates an average and systematic undervaluation upon our part, as viewed by the Canadian authorities, of about 25 per cent.

An explosion of sulphuric acid, shipped as express matter from New York on board the steamer Eolus, took place off Gould Island, and the crew were nearly suffocated by the fumes before the flames could be quenched. One of the engineers afterward died.

The bank examiner of Massachusetts demanded the resignation of Cashier Chapin on account of losses on irregular securities to the amount of \$30,000, mostly to the Beattie Zinc Company.

A new way of annealing small pieces of steel is given by a writer in the *English Mechanic*. Heat the piece as slowly as possible, and when at a low red heat put it between two pieces of dry boards and screw them up tight in a vise. The steel burns its way into the boards, and, on coming together around it, they form a practically air-tight charcoal bed. When it cools off the steel is apt to be found thoroughly annealed.

Opinions obtained by the officials of the Chicago, Burlington and Quincy, the St. Paul and the Rock Island Railroads on the question of the lower rates ordered into effect by the Railroad Commissioners of Iowa, are that the United States Circuit Court, through Judge Brewer, has enjoined the lawmakers of Iowa from making rates, at least until the question has been decided by the United States Supreme Court; consequently the railroads will follow their own inclination for some time to come.

The total quantity of wool exported from Australasia from the 1st of July, 1887, to the 30th of June, 1888, as shown by the official report, was 1,283,350 bales, against 1,185,282 for the corresponding period of 1886-87; thus showing an increase of 98,068 bales. The United States received nearly 19,000 bales direct and 4000 via London. The whole number of sheep in the colonies is nearly 96,500,000, of which about one-half are in New South Wales.

The New York and New England Railroad depot in Boston, to be finished in December, will cost \$500,000 and upward.

Gedney Channel, in New York harbor, one of the most difficult to navigate, is to be lighted by six powerful electric lamps, supplied by a cable from Sandy Hook. Three of the lamps will show a red and three a white light, it being imperative that the starboard and port sides of the channel be distinctly seen, so that vessels may make their way through in safety. Gas-lit buoys have been tried, but they require constant attention. Ice is apt to tear them away, and besides they must be kept burning day and night, as there is no way to regulate the compressed gas within them.

The chairman of the Interstate Commerce Commission, Judge Cooley, gives warning, in a letter to Chairman Blanchard of the Central Traffic Association, that there is a necessity for continuing their efforts in the direction of a uniform classification of freight. Such classification, he says, must be brought about before the lapse of any great length of time, and if not agreed upon by the managers themselves is certain to be compelled by law; and he points out the advantages of voluntary rather than compulsory conformity. In a letter to Chairman Midgeley, of the Southwestern Railway Freight Association, Judge Cooley says "that a uniform classification will be required by law before any great delay, I have no doubt. The proper authority to make it is that of the railroads themselves, and they ought to

act, in view of the necessity which will soon be upon them." For more than a year past a joint conference committee of Eastern and Western roads have been at work trying to bring about the adoption of a uniform classification, but so radically different were the views of the Eastern and Western members of the committee regarding the matter that they threw up the job in disgust a short time ago. It is hardly probable that another effort to bring about a unification of the Eastern and Western classifications will be made by the railroads, and nothing but Congressional legislation can enforce the much desired reform.

The action of the State Board of Equalization in placing an additional burden of taxation on New York City evokes earnest remonstrance. The Board, at its final session on Monday last, reported that out of a total of \$200,927,687 added to the value of real estate, nearly \$119,000,000 had been transferred from other counties, and this amount is additional to the total of \$1,560,373,506, equalized real and personal, as assessed for 1887. Westchester County, likewise, has \$17,739,948 added to the assessed value of real estate. Kings County, on the other hand, is favored with a reduction of \$23,216,023. As stated by another: "These Dick Turpins of the Board of Spoliation plunder New York of the tax on \$119,000,000, while they enable their own counties to dodge taxation on \$79,000,000 which they ought to pay." The total value of assessed personal property in the State for 1887 is \$346,611,861; total value real and personal property in the State 1887, \$3,469,199,945; total equalized value real estate, \$3,122,588,084; total equalized value real and personal 1877, \$3,469,199,945.

A recent excursion of Admiral Luce in a steam yacht through the canals from New York to Norfolk is supposed to have some connection with a contemplated movement in favor of utilizing our inland lines of water communication for purposes of national defense as well as to promote the interests of commerce, and it is not unlikely that at the next session of Congress an effort will be made to insert a clause in the river and harbor appropriation bill authorizing the Secretary of War to have the canals between New York and Norfolk surveyed, with a view of determining the feasibility and cost of such an undertaking.

The Commissioners of Public Charities and Correction of New York City intend to spend \$500,000 during the present fiscal year in renovating and otherwise improving the public buildings within their charge. The bulk of this increased appropriation will be spent in constructing new and improving old buildings and in increasing the amount of necessary supplies. On buildings will be spent \$504,400, as compared with \$17,500 for 1887. The plumbing system at the Tombs prison must be entirely renewed. A new morgue will cost \$10,000, and about \$6000 will be spent in properly furnishing the new training school for males. A new pavilion for the almshouse will cost \$37,000. Many other improvements on the island institutions are contemplated.

At last the Northwestern railroads are in harmony. They have patched up their differences and agreed unanimously to advance freight rates to the basis of 60 cents first-class between Chicago and St. Paul. This action was the result of the meeting at Chairman Faithorn's office on Thursday last. The chief cause of all the discord for years past has been the milling-in-transit rates of the roads having lines west of St. Paul. These lines were enabled to monopolize the grain and flour traffic, and the roads terminating

at St. Paul could not compete with them. The Burlington and Northern refused to agree to any advance in merchandise rates until these milling-in-transit rates were abolished, or so changed as to give the non-transit lines a share of the business at reasonable rates. The St. Paul road has held out against all propositions to compromise this difference, but has now agreed to a plan that was satisfactory all around. This plan is to throw open the transit business to all the non-transit roads, and make Chairman Faithorn arbitrator to decide from time to time the amount to be paid the non-transit lines for transporting this business out of Minneapolis. This removed the whole difficulty, and left the way clear for a general advance in other rates. It will be several weeks before the importance of the railroad settlement in the Northwest can be estimated. There seems to be an effort to accomplish something beneficial, but whether the advance in rates will be permanent only time can tell. A meeting of the Freight Committee of the Central Traffic Association ratified the agreement. The advanced rates will go into effect October 15, according to the original programme.

Mayor Hewitt's yellow fever fund amounts to \$57,490.

Peru has ratified the treaty of "amity, commerce and navigation" between it and the United States.

The National Board of Steam Navigation of the United States will be held at the Fifth Avenue Hotel, this city, on October 24.

Tractive Power of Locomotives.

Mr. M. N. Forney thus explains the meaning of the term tractive power of a locomotive. It is the force with which the locomotive is urged in a horizontal direction by the pressure of the steam in the cylinders, and which therefore tends to move the locomotive and draw the load attached to it. The tractive power is due to the pressure of steam on the pistons, and therefore its amount is dependent upon the average steam pressure in the cylinders on the area of the piston and also on the distance through which the pressure is exerted—or, in other words, on the stroke of the piston. Thus, if we have a cylinder 17 inches in diameter and 2 feet stroke, and an average steam pressure of 50 pounds per square inch, then, as the area of such a piston would be 227 square inches, the average pressure on it would be $227 \times 50 = 11,350$ pounds, and, as each piston moves through 4 feet during one revolution of the wheels, the number of foot-pounds of energy exerted by it would be $11,350 \times 4 = 45,400$, and for the two cylinders of a locomotive double that amount, or 90,800 foot-pounds. If the driving-wheels are 5 feet in diameter their circumference will be 15.7 feet, and therefore the locomotive will move that distance on the rails during one revolution, if the wheels do not slip. The 90,800 foot-pounds of energy is therefore exerted through a distance of 15.7 feet, and therefore

$$\frac{90,800}{15.7} = 5783 \text{ pounds,}$$

which is the force exerted through each foot that the circumference of the wheel revolves and the locomotive moves. If the wheels were only half the diameter, or 2½ feet, then their circumference would be 7.85 feet and the tractive power would be

$$\frac{90,800}{7.85} = 11,566 \text{ pounds,}$$

or double what it was before. It will be seen, then, that the tractive force of a locomotive is dependent upon, 1, the average steam pressure in the cylinders; 2, the area of the pistons; 3, the stroke of the pistons, and 4, the diameter of the

driving-wheels. The tractive power of a locomotive is, therefore, found by multiplying together the area of the piston in square inches, the average steam pressure in pounds per square inch on the piston during the whole stroke and four times the length of the stroke of the piston, and dividing the product by the circumference of the wheels. The result will be the tractive power exerted in pounds. The adhesion must, of course, always exceed the tractive force, otherwise the wheels will slip.

Gas-Holders Without Upper Guide-Framing.

In a paper recently presented to the British Gas Institute, Mr. W. H. Y. Webber endeavored to show that by a modification of the ordinary arrangement of bottom rollers, and by the addition of tangential rollers, the upper guide-framing, or the greater portion of it might be dispensed with. The paper described a recent invention of Mr. William Gadd, of Manchester, by the application of which a gas-holder may be guided from the bottom curb; the whole of the elevated framing being dispensed with, while at the same time the stress of wind or snow pressure upon the holder has the effect of producing greater rigidity in the structure. The weight of the guide-framing of gas-holders as usually designed and constructed, if composed of wrought iron standards, slightly exceeds that of the floating vessel, and if of cast iron columns, the weight of the framing is greater still. It follows, therefore, that the cost of the guide-framing of a holder amounts to about one-half the cost of the complete structure.

If the upper guide-framing of a gas-holder could be dispensed with altogether a saving of about 50 per cent. would be effected. Mr. Gadd's invention for dispensing with the elevated guide-framing consists in placing channel or other guides within the tank at an angle, like the thread of a screw, instead of in the vertical plane as has hitherto been the invariable practice. The guide-rollers attached to the bottom curb of the holder are ranged either radially or tangentially with the sides of the vessel, and as they work in the channel or rail-guides provided for them, a helical or screw-like motion is communicated to the floating vessel as it rises and descends in the tank. The guides attached to the tank sides may be placed at any angle from 45° upward. So long as the rollers are free to move within the guides, it is impossible that the holder can tilt so as to get out of the vertical; the tendency of wind or other pressure exerted against the sides or on the roof of the vessel being to produce what may be described—imperfectly, however—as a locking action, which will sustain the holder in the upright position, however great the strain, within the resisting strength of the rollers and their carriages. While this locking or gripping action gives rigidity to the vessel, enabling it to resist the overturning force, the rollers are perfectly free to rise and descend within the guides.

In the Supreme Court of Pennsylvania, sitting in Pittsburgh on Monday, Justice Green handed down an opinion dismissing the appeal of Jacob Reese, of Pittsburgh, in the suit of the Bessemer Steel Company. The action was brought by the Bessemer Steel Company to compel Reese to transfer certain patents involving the basic process in the manufacture of steel. The lower court decreed that Mr. Reese must assign all the patents to the Bessemer Company, for which the latter was to pay Reese the sum of \$32,000. This opinion is sustained.

MANUFACTURING.

Iron and Steel.

Lucinda furnace, of the Lucinda Furnace Company, Norristown, Pa., will blow in this week on Bessemer pig.

An order has been received by the Riverside Iron Works, at Wheeling, for 15,000 feet of steel pipe for a New York concern. This pipe is to be treated by the Bower-Barff process at Pittsburgh.

The Moorhead-McCleane Company, Soho, Pittsburgh, have recently completed a new galvanizing shop in which they expect to do general job work, devoting particular attention to galvanizing iron pipe.

At the time of the construction of the Etna Iron Works plant, at Ironton, Ohio, it was designed to build twin stacks—the Alice and Sarah. The Alice was completed and has now been worked for some 14 years, its last blast lasting four years and three months—a remarkably long run considering the kinds of ore that have been used. The Blanche furnace was never lined before, but is now almost completed, and will be blown in about the third or fourth week in October, and is expected to have a monthly capacity of 3750 tons. The lining has been made by the Scioto Fire Brick Company, of Sciotoville, Ohio, and Mr. James Wileman has had charge of the masonry work. The Portsmouth Foundry and Machine Works are doing the boiler and machinery work. The new furnace will be the exact duplicate of the Alice furnace, with the exception that some slight alterations have been made in the interior proportions, which it is expected will have a very favorable effect upon its workings.

R. C. Johnstone & Co., Dalton, Ga., have received a proposition from a Connecticut malleable iron works to locate in Dalton upon certain conditions.

The Roanoke Land and Improvement Company have agreed to give a site to the Philadelphia Bridge Company, of Philadelphia, for the location of iron bridge works at Roanoke, Va.

Recently No. 2 Bessemer mill, of the Pennsylvania Steel Company, at Steelton, Pa., made an extraordinary run in its average of over 1000 tons of steel ingots each day.

The Bellaire Nail Works, at Bellaire, Ohio, are erecting a stockhouse 150 x 300 feet, to cover their entire furnace yard and switches, so that their full stock of ore and coke can be kept housed.

The Kansas City *Times* says: "The Harrison Rolling Mill have concluded their negotiations for a site, and will begin erecting their buildings in the east bottoms within 30 days. The iron mills owned by the Heims, and now located at East St. Louis, will be moved here shortly."

A furnace is to be built by J. W. Burke and others at Jacksonville, 12 miles from Anniston, Ala.

The Springfield (Ohio) *Union* says: "The test steel plant erected by the James Leffel Company for the purpose of thoroughly testing the process purchased by Mr. Bookwalter, in France, of making steel from a low grade iron, is about ready to start."

From a Pottstown paper of recent date we take the following item: "The nail plate mill of the Pottstown Iron Company is not running this week on account of repairs being made. The gas pipes, heretofore overhead, will be taken down and the gas conducted through sewers constructed of brick underground. In consequence of the mill being idle the nail

factory closed last evening for the balance of the week. The Glasgow Iron Company's Steel Works, which have been running single turn only, will commence on double turn on Monday, October 1. This will add about 100 more men to their works. The puddle mill connected with the nail plate mill of the Pottstown Iron Company will stop to give the men an opportunity to attend the fair. Some of the other mills of the company will also stop for the same purpose. The bridge works will also be closed for the same purpose, also the nail factory of Ellis & Lessig."

Mr. J. J. Morehouse, of the Chatham (N. Y.) Furnace Company, reports that the hematite charcoal furnace was blown in on the 10th ult., after having undergone extensive repairs. At the mines, also, considerable improvements have been made—a new washer having been put in, &c. The result is that the furnace is now making a larger output of car-wheel iron than ever before.

It is reported that the Pioneer Mining and Mfg. Company, of which Sam Thomas, of Pennsylvania, is president, will build a new furnace and rolling mill at Thomas, four miles from Birmingham, Ala. The total cost will be \$500,000. The furnace will have a capacity of 100 tons of pig iron per day, and the rolling mill 150 tons of merchantable iron daily, and will give employment to over 1000 men.

Since the Thomas Iron Company, at Hokendauqua, Pa., bought their hematite ore by the unit the average percentage in metallic iron has increased from about 36 per cent. to an average of 42 per cent. This, of course, has increased the output, at the same time leading to a saving in fuel and in flux.

Top Mill Furnace, Wheeling (W. Va.) Iron and Nail Company, will probably blow in on or about the 15th of October.

Charlotte Furnace, Charlotte Iron Works, Rochester, N. Y., is being prepared for a renewal of operations, which it is expected will take place before the close of the current month.

Mount Laurel Furnace, Clymer Iron Company, Temple, Pa., is having a new bosh and lining put in. It is expected that it will be ready to blow between the 15th and 20th of this month.

Florence Furnace, Henderson Iron Company, Sharpsville, Pa., which blew out on the 19th ult., is undergoing repairs, which will probably be completed by the 1st of November.

Machinery.

The Delaware and Hudson Canal Company have commenced the erection of new shops and a large roundhouse at Whitehall, N. Y.

The Whittier Machine Company, of Boston, Mass., have recently constructed for the West End Street Railway Company, Roxbury, Mass., a freight elevator for their stables.

Wm. B. Pollock & Co., proprietors of the Mahoning Boiler Works, Youngstown, Ohio, write us under recent date that they have been very busy for the past year and have considerable work ahead of them. They manufacture boilers, build blast furnaces and execute sheet-iron work of all kinds.

The Belden Machine Company, of New Haven, Conn., write us under recent date that they represent to a certain extent a continuation of the Danbury firm formerly known as the R. A. Belden Company, which is now extinct. The new company have purchased a large factory in New Haven, formerly occupied by the Mansfield Elastic Frog Company, and have filled it

with improved machinery. They will continue to manufacture the Belden improved power hammer and the Belden crank planer, and also a full line of drop forgings made from special patterns. They use drop hammers of their own build. They make and repair machinery, and in a general way turn out anything in the drop forging or special machinery line that may be wanted.

B. W. Payne & Sons, of Elmira, N. Y., have just sent us a new catalogue, which is devoted wholly to their high speed Corliss engine. This engine, as some of our readers may perhaps remember, is noteworthy for the fact that it combines a Corliss valve gear with a shaft governor and runs at a speed which is remarkably high, compared with the customary speed of ordinary forms of Corliss engines. The engine is illustrated in detail, and the engravings will no doubt be examined with a good deal of interest by engineers.

The Norton Emery Wheel Company, of Worcester, Mass., have just issued a new catalogue and price list of emery-wheels and emery-wheel machinery generally. It is profusely illustrated, showing a large number of different types of grinders, and gives all the information which prospective users of such tools may require.

The Columbus Machine Company, Columbus, Ohio, have issued a new catalogue and price list of their various manufactures. It contains illustrations and descriptions of their blowing and rolling mill engines, and stationary engines of various designs, boilers and boiler fittings, shearing machines, &c. Pulleys and gearing are also treated of, while the concluding portion of the catalogue is given up to illustrations of architectural ironwork of various kinds.

Messrs. W. D. Allen & Co., 151 Lake street will hereafter have control of the Chicago branch of the New York Belting and Packing Company. Messrs. Allen have for a number of years done an extensive business in leather belting for the account of Fayerweather & Ladew.

A brief outline of the Ball system of arc lighting is given in a small, eight-page catalogue just issued by the Ball Electric Light Company, 18 Cortlandt street, New York.

The Reliance Gauge Company, of Cleveland, Ohio, have received through the Reading Iron Works, of Philadelphia, another order from the Pencoyd Iron Works, of Pencoyd, Pa., a suburb of Philadelphia, for eight of their safety water columns. This is the fourth order from the Pencoyd Iron Works.

A Buckeye automatic engine of 125 horse-power is driving three of the Western Edison Electric Light Company's dynamos at the Chicago Exposition, furnishing power for 104 arc lamps. A similar number of lamps are run by a Russell engine, made at Massillon, Ohio.

The Schuyler Electric Company, of Middletown, Conn., makers of dynamo machines, arc and incandescent lamps and all articles relating to electric lighting and the distribution of electric power, have issued a catalogue describing their system at some length. Engravings are given of the Schuyler dynamo, together with enlarged views of their new safety armature, their automatic regulator, and single and duplex arc lamps, incandescent lamps, &c. Brief chapters are devoted to plans of lighting cities and towns, the cost of electric lighting, the power required and other matters.

Messrs. Pedrick & Ayer, 1025 Hamilton street, Philadelphia, have issued a small pamphlet devoted to the interests of their heavy universal milling machine. The

machine is briefly described, and a very flattering report on it, made by the Committee on Science and the Arts of the Franklin Institute is appended.

The Jewell Belting Company, of Hartford, Conn., have just completed a belt 5 feet wide and 140 feet long, of two thicknesses of leather. It weighs over 1600 pounds.

The contract for steam boilers for Spreckels' sugar refinery, at Philadelphia, has been given to the Babcock & Wilcox Company, of New York. There will be 7500 horse-power of boilers furnished at a cost of \$139,800.

The Fitchburg Machine Works, of Fitchburg, Mass., are sending out a neat little catalogue devoted to their line of metal working machinery. It gives illustrations and brief descriptions of their different tools, and will, no doubt, be examined with interest by machinery users.

The addition to the machine shops of the Portage Lake Foundry and Machine Works, of Messrs. Stephen E. Cleaves & Son, Houghton, Mich., which was begun in June, is now completed except the erection of the machinery. Its dimensions are 40 x 40 feet, while those of the shop as it stood before are 40 x 80 feet, making the completed building 40 x 120 feet. The principal piece in the machinery equipment of the addition is to be a lathe weighing 28 tons, the largest in the Upper Peninsula outside of the machine shop of the Calumet and Hecla Mining Company. It is being made by the Niles Tool Company, of Hamilton, Ohio, and will arrive in a short time. A stone foundation for a new foundry building, 65 x 150 feet in size, has recently been laid around the foundry building now used.

Catalogue No. 15, issued by the Dean Brothers Steam Pump Works, of Indianapolis, Ind., has just come to hand. It is a very creditable specimen of trade literature from a typographical point of view, and, besides, is not lacking in value as a source of information on the company's manufactures. Their different makes of pumps are illustrated in elevation and section, and engravings are also given of their combined pumps and boilers, together with detailed tables of sizes and prices.

Messrs. A. J. Sweeney & Son, of Wheeling, West Va., write us as follows, under date of September 25: "In our boiler yard we do very little outside of first-class marine work, upholding a much higher standard of workmanship than generally obtains in repair shops. In dull times we take in some outside repair jobs, but only to keep together our boiler yard gang. In consideration of the higher skill of our workmen we have paid an average of from 50 cents to 75 cents per day more money than others here. The object of the strike seemed to be to induce Messrs. Cox & Morrison to increase the wages of their men. The boiler-makers presented a schedule, the items of which we were complying with, with the possible exception of a claim for \$1 extra per day—that is, their wages should be increased \$1 per day when they were working on what is known as repair work—namely, boilers and the like, which is very dirty and arduous kind of labor. When the committee called on us it was headed by a man named John Ehman, who is publisher of a little sheet in this city, presumably devoted to the interest of workmen, and calculated only to make the most trouble for all outside parties. So soon as we discovered the identity of Mr. Ehman we refused to at all consider the schedule of prices; our men were entirely satisfied, and one of them was on the committee who called on us. They did not desire to strike, and were perfectly satia-

fied with the way we were paying them, but were whipped into line by the fear of being called black sheep. We refused point blank to consider the question at all as long as any one beyond our own boiler yard was connected with it. Messrs. Cox & Morrison have concluded a settlement with their men, and compromising on a scale to be paid for repair work in proportion to the value of the men employed. Our men are still out, with the exception of one who refused to remain with them, and so long as they continue to countenance such cattle as this man Ehman they will still be out, so far as we are concerned."

A new catalogue, dated 1888-89, has just been issued by Messrs. Edward P. Allis & Co., of the Reliance Works, at Milwaukee, Wis. The catalogue is specially devoted to mill and engine supplies, and will be found to contain a large amount of desirable information bearing on these branches. It is profusely illustrated, and contains extensive price lists.

The Baltimore and Ohio Railroad Company are fitting up 20 cars with the Johnson electric heat regulating device, and will equip 95 cars at once. Last fall a single car on this road was thus equipped and has given entire satisfaction ever since. The result was this order, which, we understand, is to be followed by others. Several other roads are also testing this device.

The Clayton Air Compressor Works, of Brooklyn, with a New York office at 43 Dey street, have sent us an advance copy of their catalogue No. 6. It fully illustrates and describes in detail the different styles of the Clayton air compressors, duplex and single, worked either by steam directly or by belting or gearing. In addition it gives much information and data of interest to users of compressed air, and descriptive tables and price lists of rock drills, hoisting engines, mining and boiler feed pumps, pneumatic locomotives, &c.

The Wheeler & Wilson Mfg. Company, of Bridgeport, Conn., started their works again last week. Important changes have been made, including the reduction of employees from 1100 to 800, the running now on eight hours' time, the abandonment of the former contract system, so that most of the work is now done without the intervention of contractors, and considerable reduction in the price of the few contracts that are continued. A stockholder said recently that the company used to pay 100 per cent. annual dividends, but for the past five years had not averaged over 2 per cent. There had been one time in the past when the stock was worth \$5 for \$1. He did not think it would pay over 5 per cent. in the future.

Miscellaneous.

The Holyoke Hydrant and Iron Works, of Holyoke, Mass., are sending out a small catalogue illustrating and briefly describing an improved form of fire hydrant built by them.

The Baldwin Locomotive Works are exceedingly busy completing orders on hand. The last consignment of the order for 60 locomotives for the Reading Company has just been made. The Pennsylvania Railroad have contracted for 50 eight-driver freight locomotives, and 20 have been delivered. A shipment of 10 narrow-gauge locomotives to the Mexican National Railway made last week filled 30 cars. Altogether the company turned out 70 locomotives during September, and it is expected that the record for the year will be 730 locomotives, or more than two daily.

T. William Harris, of the firm of T. William Harris & Co., 44 Broadway, New York, was elected, September 22,

secretary of the Pomeroy, Middleport and Syracuse Street Railway Company. This road will extend from Middleport to Syracuse, Ohio, a distance of over ten miles, and will be built in a most thorough manner for its large freight and passenger business.

The William Cramp & Sons Ship and Engine Building Company, of Philadelphia, on Saturday launched William P. Clyde & Co.'s new steel steamer Iroquois. The Iroquois is 300 feet long, 46 feet beam and 29 feet deep, with a measurement of about 3000 tons. She is the first large steel steamship built in this country for the merchant service, and is fitted with steam steering gear and lighted by electricity. She is to have triple-expansion engines, and to be fitted up with first-class accommodations for 200 passengers. She is to be used in the coastwise service from New York, beginning about November 1.

The Atlantic Cotton Mills, of Lawrence, Mass., are obliged to use a few electric lights each day, and purchased a year ago a 45-arc light plant (Waterhouse system), and have turned on and off lights at will, the Waterhouse regulator giving satisfaction and maintaining a steady current under partial or full load. The plant has been increased 77 lights, the order being given to the Waterhouse Electric and Mfg. Company, of Hartford, Conn.

Prime Movers.

Sir Frederick Bramwell, in his recent presidential address before the British Association for the Advancement of Science, remarked:

There are prime movers and prime movers—those of small dimensions, and employed for purposes where animal power or human power might be substituted, and those which attain ends that by no conceivable possibility could be attained at all by the exertion of muscular power. Compare a galley, a vessel propelled by oars, with the modern Atlantic liner; and first let us assume that prime movers are non-existent and that this vessel is to be propelled galley fashion. Take her length as some 600 feet, and assume that place be found for as many as 400 oars on each side, each oar worked by three men, or 2400 men, and allow that six men under these conditions could develop work equal to 1 horse-power, we should have 400 horse-power. Double the number of men, and we should have 800 horse-power, with 4800 men at work, and at least the same number in reserve, if the journey is to be carried on continuously. Contrast the puny result thus obtained with the 19,500 horse-power given forth by a large prime mover of the present day, such a power requiring, on the above mode of calculation, 117,000 men at work and 117,000 in reserve, and these to be carried in a vessel less than 600 feet in length. Even if it were possible to carry this number of men in such a vessel, by no conceivable means could their power be utilized so as to impart to it a speed of 20 knots an hour. This illustrates how a prime mover may not only be a mere substitute for muscular work, but may afford the means of attaining an end that could not by any possibility be attained by muscular exertion, no matter what money was expended or what galley-slave suffering was inflicted. Take again the case of a railway locomotive. From 400 to 600 horse-power developed in an implement which, even including its tender, does not occupy an area of more than 50 square yards, and that draws us at 60 miles an hour. Here again the prime mover succeeds in doing that which no expenditure of money or of life could enable us to obtain from muscular effort.

The Iron Age

New York, Thursday, October 4, 1888.

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CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Profits on Silver Coinage and the Surplus.

There seems to be a good deal of uncertainty as to the amount of the surplus in the United States Treasury. Some say there is practically none at all. Some say there is more than \$100,000,000. Some say there would be none if the imperatively necessary expenditures for National objects and for the payment of the actual obligations of the Government were provided for. Some say that if there is a surplus, it should be spent in buying bonds of the Government not yet due. And, of course, there are many schemes good, bad and indifferent, for disposing of the surplus, if there be one.

Strangely enough, no one seems to realize where a part of the surplus has actually come from. It is apparently accepted by all parties that this money has been taken "from the pockets of the people" through the medium of an excessive collection of revenue. Why has not some keen economist recognized the fact that \$40,000,000 nominally in the Treasury has never been in the pockets of the people at all, but is simply the profits of the Government, derived from the simple process of buying silver bullion at the market rate, and coining it into dollars at the rate of \$1.29 per ounce? The last report of the Director of the Mint shows that the "seignorage" on silver coinage during the fiscal year ending June 30, 1887, was nearly \$8,000,000, and that the total net profits of this business during the nine years of its continuance, after deducting cost of coinage, losses of metal, and money paid by the Government in shipping silver dollars free to all parts of the country, in order to facilitate their circulation, amount to \$38,601,277. Estimating the results of the three months which have since elapsed, it is safe to say that these "profits" now amount to \$40,000,000. We are therefore justified in saying:

1. If the United States had made the same purchases of bullion, at the same prices, as has been actually the case, but had coined dollars of full value, so as to make no "fiat" profit on the business, the silver producers would not have been affected; there would have been no difference in the course of trade, but there would now be a surplus of only \$80,000,000, instead of the \$120,000,000, which the Treasury officials claim it to be.

2. If the United States had coined the same number of dollars as it has done, but had made them of full value, the silver producers would have had the benefit of \$40,000,000 additional purchases of bullion; the price of silver would have been to that extent supported and there would now be so much less surplus.

3. If the United States should desire to enter into an international agreement for the remonetization of silver throughout

the civilized world, it would be obliged, as clearly appears from the report of Mr. Edward Atkinson on that subject, to recall and recoin its silver-dollar coinage. This would involve two losses: first, the loss of the fictitious value attached to the coins over and above what the metal actually cost the Government; secondly, the loss due to the continued fall in the market price of silver. The two, together with the expense of recoinage, would cost the Government nearer \$100,000,000 than \$40,000,000, and practically the surplus would disappear.

In other words, to the extent of \$40,000,000, the so-called surplus is no more real than if the Government had printed paper notes to that amount and piled them in the vaults. These \$40,000,000 never were "in the pockets of the people." They never were anywhere. They represent nothing but an illusion, and they might well be dissipated (spent is hardly the proper word) in putting more silver into the silver dollar. At present it is a the boast of counterfeiters that they make as good an article as the Government—equal in fineness and weight—and the profits, at the ruling price of silver, are from 25 to 30 per cent. Let the United States go out of competition with counterfeiters, and their "surplus," as well as its "surplus" (*arcades ambo*), will disappear.

Position of the French Copper Syndicate.

It is a somewhat difficult matter to understand what Congress can possibly do to embarrass the operations of the French copper syndicate or aid manufacturers and consumers to shake off the grasp it now has upon them. A reduction in the present duty on copper and ores of copper, or its entire suspension, would have practically no effect, except in one contingency, which is remote. They might mark up prices in this country, having control of its output, above the prices elsewhere in the world, to the extent of the duty, even if there were sellers in other parts of the globe willing and eager to supply a part of our demand. Exporting our surplus they might use it to whip into line recalcitrant producers elsewhere, and make the consumers in the United States pay the piper. That, so far as we can see, is the only contingency in which the fact that copper was duty free might prove troublesome to the manipulators of the markets.

So far as the American mining companies are concerned their position seems to us to have only one possibly weak point. They can claim justly that they have the right to decide to whom they will sell, at what prices and for how long a time. It is a private business affair, with which no legislature, State or national, has any concern. They have made their sales individually, without any concerted action on their part, and the terms are by no means identical, although they are similar. So far they are invulnerable. But if they have, individually or collectively, made any compact embracing as one of its features an agreement to limit production, their action may be construed to constitute a restraint of trade. So far as we know, that is not an offense which is, or can now be, punished under national laws, but there is a distinct and strong

current in public opinion which favors their enactment and rigid enforcement.

As a matter of fact, the syndicate has placed the limits of its purchases high. So far as is known, they have agreed to take for three years the full product of the mines in any recent year, and, in some cases, have made allowance for a liberal annual increase. Thus, in the case of the Tamarack Company, which produced in the fiscal year ending June 30, 1888, a little over 10,000,000 pounds of ingot, the sale provides for 14,000,000 pounds in the first year, 17,000,000 pounds in the second and 19,000,000 pounds in the third year. The Boston and Montana, which lately reached its greatest output thus far, of 2,225,000 pounds in one month, may deliver 100,000,000 pounds in three years. A similar case is presented, so far as the Parrot, of Butte, Montana, is concerned. It is the knowledge of this fact which has aided in forming the conviction among the majority of manufacturers and consumers that the steadily increased burdens must ultimately break the back of the speculators.

There is little hope for manufacturers and consumers from the agitation now going on. They can only look to natural causes to free them from the incubus under which they are now suffering. We know how keenly they feel it, and since the publication in *The Iron Age* of September 20th of letters from electrical companies, we have had additional communications, showing even more emphatically that important work has been checked by high prices. While there are some who are sanguine enough to believe in an early collapse, we are convinced that a realization of the power of the syndicate has been spreading among manufacturers. It is true that the statistics abroad look black, but they naturally exaggerate in one direction. They deal with the "visible supply" only. They show that a very large part of the metal produced during the past ten months has not gone into consumption. But they fail to indicate, what everybody connected with the manufacturing industries knows, that the whole world has been swept clear of its supplies of old material and scrap, that the stocks of raw material and of partly manufactured goods and of finished articles have been reduced to a minimum. Through the entire period the syndicate has retained its power, and it may well be said that for the present the first most critical period has been passed. The principal sources of supply are under control. In fact, the accumulation of heavy stocks in the hands of the syndicate gives it a means of coercing those who were until now the chief beneficiaries of its operations. So far as the attitude of consumers on the one hand and of the ability of the syndicate to take care of accumulations of metal are concerned, the situation seems pretty well defined, and there is little doubt that thus far the speculators have come out the victors.

It will remain for them to take care of the constant increase in the production of copper from outsiders. At first, the skepticism of every one connected with the copper industry had a powerful influence in deterring others from opening old mines or starting new work. There are probably few who have the reputation of being authorities in the copper trade who

were not asked for their opinion late last year and early this year on the outlook, and who did not hesitate to warn their friends. Later, the collapse in the tin speculation seemed to confirm the views of those who were conservative. It was difficult to find capitalists ready to advance funds to unwater old mines, put old plants into condition for use, or to buy supplies, fuel or new machinery. Since it is known that great financial powers are back of the speculation, since their ability to handle great contracts and to hold enormous stocks are well known, the situation is changed. The promoter has easy work, since no more profitable field can well be found. Nearly every mine, however miserable its past career, now has its enthusiastic friends, and can get money. This country is being scoured by independent prospectors and by the employees of men who are coining money in their present copper investments. Every one reasons that, if the French syndicate can take care of the product of the great mines of the world, it will assume additional burdens from newcomers who demonstrated their ability to be troublesome.

But all this takes time, and this year certainly will pass before much metal can come from new sources. Even later the development of outside production must be slow, and it would seem, therefore, that after having withstood the strain due to the opposition of consumers, manufacturers and the trade, the syndicate will for a time be in a relatively strong position. It has entered this period, which may be prolonged till next spring unless some unforeseen financial disturbances or complications in negotiations with such a producer as the Anaconda mine, of Butte, forces or induces them to change its attitude. For the present there seems little hope of relief.

Interfering with Fuel Oil at Chicago.

The question of cheap fuel for Chicago manufacturers has by no means been entirely settled with the successful operation of the Lima oil pipe line. Fuel oil can now be had in abundance, it is true, and every day sees its more perfect adaptation to all sorts of purposes for which fuel is used, but the insurance companies have stepped in, and, by raising rates on buildings in which fuel oil is burned, have interfered with its general introduction. These companies have convinced the Mayor, the Commissioner of Public Works and the Chief of the Fire Department that the use of fuel oil is dangerous and have received assurances that permits will not be issued for it indiscriminately. The Board of Underwriters then adopted a rule that no risk on property should be taken where fuel oil was used, unless the owner had a permit from the Commissioner of Public Works and the building had been inspected by the superintendent of survey of the Board of Underwriters, and, even then, only at an advance of 1 per cent. on the regular rates. A provision in the rule adopted states that an agent may write a policy, under all proper restrictions, when the fuel oil used is 300 per cent. proof, but oil of that kind is not used for fuel. An ordinance has also been introduced into the City Council to regulate the distribution of fuel oil within the city limits,

but, pipe lines not being contemplated within the city as yet, such legislation is only anticipatory.

This shows that the use of fuel oil in the West will not be very general among manufacturers until the fears of the underwriters are allayed. They have some reason for their hostility to this fuel, as shown by recent disastrous fires in various parts of the country, originating, as they allege, from its use. It is their duty to protect the interests of their companies and to reduce fire risks as much as possible, just as well as manufacturers feel impelled to introduce economies in their various lines of business to secure greater efficiency or increased profits. They cannot be censured for such action, as every manufacturer is to some extent interested in maintaining solvent insurance companies. Should his factory burn he wants the insurance for which he has paid. Underwriters who take risks of any degree of hazard are as much to be avoided as reckless men in any other line of business. But the increased rate which they impose in Chicago for permitting the use of fuel oil will, if enforced, prevent its use, because the enhanced cost of insurance may more than offset the saving as compared with coal. This has been the case at the Leland Hotel, in which oil was used with perfect satisfaction to the proprietor and all concerned, but it had to be abandoned when the rate of insurance was raised 1 per cent.

Insurance companies, like other human institutions, are managed by men who are liable to be erroneously informed or who arrive at conclusions upon insufficient data. It is asserted by the Chicago manufacturers that they have erected storage tanks free of the possibility of explosion, locating them away from all buildings and inclosing them with brick walls, taking every precaution against danger of fire, yet the underwriters have advanced their rates, notwithstanding the belief expressed by experts that such risks were not extra hazardous. To guard against the charge that the insurance companies are seeking to secure an extra profit from their customers under color of the danger attending the use of fuel oil, the underwriters should discriminate intelligently between the person taking necessary precautions and the one using no safeguards whatever. This is the course which should be pursued and which will ultimately have to be adopted. Insurance companies cannot stand in the way of progress. It would be better for them to promote it. They can do this by the very act of exercising discrimination. The varying rates of insurance according to the method of using fuel oil would compel the introduction of the safest and most efficient appliances.

Too much has thus far been accomplished in the vicinity of Chicago in the successful use of fuel oil to let the action of the underwriters interfere very seriously. Both within the city limits and outside of them are large establishments of various kinds whose managers would be very loth to return to the use of coal after having overcome the difficulties attending the introduction of fuel oil. The Union Steel Company have used oil since the 21st of last March for making steam, and hope soon to perfect arrangements for heating steel ingots and blooms with it. Experiments are in progress at the Joliet Steel

Works, and the North Chicago Rolling Mill Company will also probably soon introduce it, pumping their supply from the Standard Oil Company's storage tanks through an independent pipe line to the South Chicago plant. Numerous manufacturing establishments in other lines are using fuel oil and speak well of it. Its use has almost revolutionized brick-making, all the large kilns near Chicago being now burned by oil, with great economy in time, labor and fuel. The absence of smoke is another important result of the use of oil, which makes it a desirable fuel in competition with soft coal. This is a nuisance which Chicago earnestly desires to abate, and the insurance companies should help the citizens in their efforts to get rid of it rather than stand in their way.

The Course of the Lead Market.

The course of lead prices has seldom been so erratic as it has been so far this year. The range in the New York market for common domestic was as follows:

Fluctuations in Prices of Lead, 1888.

January...4.95¢ to 4.90¢	June...3.92½¢ to 4.10¢
February...4.90¢ to 5.15¢	July...3.80¢ to 3.85¢
March...5.15¢ to 5.15¢	Aug...3.85¢ to 4.80¢
April...5.15¢ to 4.60¢	Sept...4.95¢ to 5.05¢
May...4.60¢ to 4.05¢	

Since the beginning of the year the speculative holdings in this city, either in the hands of the chief operator alone and his followers, have been large, most of the time 15,000 tons and more. The parties interested were in hopes that the spring demand would be active enough to enable them to realize advantageously the accumulation then held, bought at all sorts of prices, but in this they were disappointed. The spring trade proved very limited so far as lead manufactures were concerned, the consumption falling 30 per cent. short of the average. The consequence was that pig lead dropped in midsummer to very low figures, all the way to 3.80 cents in the New York market. Several from among the chief consumers in this vicinity availed themselves of this welcome opportunity and laid in a supply which they would otherwise not have bought before September or October. The speculative holdings were thus somewhat reduced, but, with the approach of the fall months, the main operator again increased his interest, and at the same time more active dealings were inaugurated at the Metal Exchange. A serious manipulation had now commenced to obtain control of all the lead available on this coast and dictate terms, if possible, to the consumers that might be compelled to re-enter the market in September and October. But here again there was a miscalculation; in September the trade in manufactures again failed to answer expectations, and during the entire month consumers only bought occasionally small amounts while waiting for a freer development in the demand for their goods. With fair weather and under the impulse of a generally good fall trade October may still bring it; but this is as yet doubtful. In this manner the interest in this great bull deal centers on the month we have now entered. October passed, with not much better results, and an early winter perhaps following, the owners of the present accumulation would find themselves in anything but an enviable position.

At the bottom of the general lead situation on this side there has been all along the reaction in real estate, the decrease of building, and the diminished consumption of lead manufactures, including white lead. But for this great drawback everything might have gone smoothly. It is now hoped that next year will prove very prosperous, in view of the comparatively fine crops we have, and the big prices likely to be realized for them all the way till the next harvest. Building, it is confidently hoped, will then flourish once more, and with it lead manufactures, including white lead, will sell freely at full figures. We trust all these expectations may be fully realized; still, it is a long way off, but this does not prevent the white lead manufacturers from making full preparations even now, nor from trying to concoct a sort of ironclad combination of the "trust" species. On the plea of a more expensive raw material, the price of white lead in oil has been advanced no less than $\frac{1}{4}$ cent. per pound, some 35 leading manufacturers all the way to Omaha having sided with this movement. So far, white-lead combinations have not proved successful, but with better experience they count on good results this time, and, following as they do in the wake of this current which gives birth to a fresh combination of the kind in some branch or other about every week.

In Europe lead has also improved a couple of pounds sterling per ton since summer, not because consumption has gained on production, but because there is now a better prospect that an international lead syndicate will be formed on a basis promising stability. How long such a combination will hold good seems to us doubtful, however, in the face of the large amounts of lead arriving in Europe from a new quarter, Australia. We hear that the proprietors of the Mechernich lead mines and works in Germany are jubilant over the prospect, as they will be particularly benefited, and that the Commern Union, which has lain idle for years, will resume operations. At any rate, taking everything into due consideration, it will be the part of wisdom not to be too sanguine. Production is large, both here and in Europe and Australia; the rise in silver stimulates it still more, while the better times for lead manufactures have yet to come. To put up prices so long in anticipation and thus check and frighten consumption before it freely manifests itself seems to us meanwhile the reverse of a sound policy.

It is interesting to note the degree of popularity which the American naphtha launch has already attained abroad. Thus, following closely in the wake of Messrs. Yarrow & Co., the British builders, to whose so-called "Zephyr" launches we referred in previous issues, comes a Swiss firm, Messrs. Escher, Wyss & Co., of Zürich, who, we are told, recently had under trial a similar boat, with successful results, the principles involved in both vessels being those of the launch first described by us about a year and a half ago and built in New York. It may not be amiss to point out here that, so far from being the result of independent investigation on the part of Mr. Yarrow, the Zephyr launch is built by him under a royalty to the American company, this fact having received no special mention, apparently for business reasons, the idea

having been to allow the English public to fondly imagine the invention of the launch as of English origin. We know nothing definite of the later Swiss launch, but can safely take it for granted, we think, that its details present nothing strikingly new. The results in each case have shown naphtha vapor to be an economical and a generally satisfactory working fluid for an engine, though nothing further in the line of practical examination has been done since the recently noted tests carried out in England and the incomplete experiments conducted in this country several months ago. Promises of new trials, however, have been made, and the prosecution of these will, no doubt, bring forth additional noteworthy and interesting facts.

Commercial Conquest.

The rivalries of commercial nations are bringing about strange transformations. Islands are tossed from one flag to another as dust is shifted in a balance, and through the arts known to diplomacy colonies are being planted here and there in comparatively unknown regions, with reference to an extension of trade rather than the mere acquisition of territory. Hence, it would appear that modern nations accept the fact, which monarchs of the olden time were so slow to comprehend, that "peace hath its victories as well as war"; that, indeed, there is a process of peaceful subjugation far more effective even in a mercenary point of view than is possible through the exercise of mere brute force. At this moment the leading powers of Europe, notably England and Germany, are engaged in schemes for the extension of trade on a scale that would seem to take the entire terrestrial ball within the scope of their ambition, but we seldom hear a hostile gun. Herein do we witness a vast stride in the development of a modern civilization as contrasted with the ensanguined march of armies in the past.

The enterprise which most challenges attention at the present moment is the opening of Central Africa, those almost impenetrable regions in which Livingstone, Stanley and sundry "relief" expeditions have acted as pioneers. Thus far we have heard of British West Africa and a British South Africa, but the exterior line of coast does not suffice as a field for commercial exploit so long as the vast fertile plateaus of the interior, with their swarthy millions of inhabitants, have not been reached.

Two years ago an Anglo-German agreement was formed for the amicable division of a territory in the jurisdiction of the Sultan of Zanzibar, on the Eastern coast, including a strip 150 miles long and 10 miles broad, exclusively for British occupation. This land, acquired originally by a trader named Mackinnon under a concession, has now been transferred to the "Imperial British East African Company," under a royal charter. It comprises the commodious port of Mombassa, capable of holding 20 ironclads, and forms the base of an irregular triangle, having its apex on the Eastern shore of the great inland sea, Victoria Nyanza, and is contiguous to the twin section of territory under German influence. This intermediate tract, with its lands of exhaustless fertility, its forests filled with valuable

woods, is assumed to be the area of grand commercial possibilities. Among the ultimate designs clearly hinted at is the growth of wheat, cotton, tobacco and other products of the soil, which may eventually, like the East Indian possessions, serve as a source of supply for the United Kingdom, independent of all others. As described by a correspondent of the *London Times*:

The interior highlands are in many places peopled by a really fine race, shut out from the coast by Semitic influence. Millions of natives, living in fair and fertile, temperate, and even bracing regions, requiring supplies of clothing, have hitherto been compelled to use hides and skins for clothing for want of better material. This circumstance gives an indication of the vast prospective importance to British manufacturers of cotton goods of the opening up of that immense new market for their products, which promises to be not the least striking result of the development of the company's territories.

Two extensive plateaus have an elevation of some 2500 feet, capable of becoming a permanent settlement for colonists, a new center of trade, and a railway of 300 miles would bring what is believed to be a wheat country of great extent within less than a day's journey of Mombassa, the gateway from the ocean. The great labor problem which this scheme immediately presents is supposed to have its solution in British India, as not fewer than 7000 natives of India have already established themselves as traders and merchants in the Zanzibar dominions, and the Indian Government is favorably disposed to a wholesale emigration. It would appear, therefore, that a vast field, hitherto inaccessible, is freely offered to the commerce of the world, and that beyond, in the interior, like vast spaces in the stellar universe, there are new worlds to conquer. The trade of Uganda, of Unyoro, of Emin Pasha's provinces and the Upper Nile, and around the great lakes, we are told, is bound to be drawn to what will in time be its shortest and cheapest outlet to the coast.

What the Germans are attempting in Eastern Africa we are not privileged to know, but the probabilities of success are apparently as flattering as in the unfortunate island of Samoa, where the efficacy of guns and bayonets is under trial, with the entire population in arms to expel the invaders. And French conquests in Tonquin, if viewed from the commercial standpoint are far from flattering.

In our notice, a few weeks ago, of the steam trials of the Italian ironclad *Lepanto*, some prominence was given to the fact that a large number of locomotive boilers were used on board that vessel with very good results. Those who have followed the performance in the past of boilers of this type in sea service—in torpedo boats, for example, where they are at present used to the exclusion of all others, because of their compactness and capacity for high pressures, are well aware of the unenviable record which they have there established for themselves, giving out with alarming frequency from several causes, prominent among them the failure of the tube plates. The experience gained on board the *Lepanto* would therefore seem to be suggestive of something radically wrong in the ordinary practice of locomotive boiler design for shipboard use. Taking the boiler as a type, simply, it is

natural that the varied circumstances attending its employment have affected, with good or with little reason, some of the details of construction, and in these are easily found explanations for the erratic behavior of the boiler in different situations. Thus, in its legitimate sphere, railroad work, where the boiler could not well be successfully displaced by any other existing form, and where its performance has been all that can be desired under the circumstances, it has some features which are not always found in a locomotive boiler at sea. In the first place, the grate is placed well below the level of the tubes, and then again a fire-brick arch is built in the furnace, affording full protection to the tube sheet against cold-air currents and against the fierce heat of the fire. Examining any of the published designs of torpedo boat boilers we will find that in both these respects there is a marked difference. The brick arch has been left away entirely because of cramped room, and the grate is comparatively high, so that the alternating effects of an extremely high temperature and cold air blasts on opening the furnace doors bear directly and with destructive results on the tube ends and sheets. The Lepanto's locomotive boilers, we find it stated, were fitted as is usual in railroad practice, and, accordingly, as remarked in the report of the trials, they gave no trouble whatever, but furnished every evidence of good working from the beginning to the end of the whole series of tests. It is safe to say, therefore, that if only a true locomotive boiler were tried in all cases at sea it would give complete satisfaction. It should be borne in mind that the torpedo boat boiler upon which unfavorable conclusions have been so largely based cannot, strictly speaking, be called a locomotive boiler, lacking, as it does, some of its essential peculiarities.

Magnetite Ores and Foundry Iron.

The *Journal of the Charcoal Iron Workers* has introduced a new feature in the form of answers to questions suggested by its editor. Among those printed in the issue just published we find the following reply by Edgar S. Cook, manager of the Warwick Iron Company, of Pottstown, to the question, "Why is it difficult to make good foundry pig iron from a burden of all magnetites?"

Good "foundry iron" may be considered a comparative term, for a brand unexcelled for some purposes may be almost worthless for others, and *vice versa*. Within recent years these distinctions are being made with some intelligence and judgment, but there is still room for improvement. Used in a general sense, good foundry iron may be considered soft, open grained pig irons, best adapted to the greatest variety of foundry work, and capable of carrying a large percentage of scrap. For special purposes, equally as good foundry iron can be made from all magnetites as from any other mixture of ores, but as a rule irons made from magnetic ores exclusively will not rank as high as those made from mixtures consisting largely of brown or red hematites.

The difficulty of producing a large percentage of foundry iron with magnetic ores was more marked with the small anthracite furnaces of former years than with the larger and better equipped plants of more modern construction. The use of a portion of coke has made the management also somewhat easier, and consequently enabled the percentage of foundry iron produced to be increased.

The difficulties attending the production of a large percentage of foundry iron from all magnetic ores are due to several causes. Mention will only be made of the leading ones. Within certain limits, the greater the ease with which the iron of an ore parts with its oxygen the more regularly and rapidly will the furnace perform its work of reduction and melting, and the hotter will be the crucible with the same weight of fuel. That the reduction of magnetic ores proceeds more slowly than of brown hematites or red oxides is probably due as much to their mechanical structure as to any difference in chemical composition. Most of magnetic ores available in the Schuylkill and Lehigh Valley districts of Pennsylvania are dense, close, compact ores. These ores, even when entirely free of sulphur, are more or less difficult to work, especially when filled into furnace in large pieces or masses, too heavy for one man to conveniently lift into a charging barrow. The writer has seen the dense New Jersey magnetites so filled into furnaces and at the same time the managers were complaining of the impossibility of making foundry grades, and the tendency of the furnace to work irregularly, or to run off on white iron, without (to them) any apparent cause.

The furnace gases experience more or less difficulty in penetrating, breaking up and de-oxidizing dense ores; they can be broken down more cheaply with hammers. Open, porous ores, or ores containing considerable combined water, are quickly and thoroughly permeated. In consequence, with magnetites there is a greater consumption of heat in the lower parts of the furnace, and, from the presence of ore only partially reduced, there is apt to be sudden variations in the temperature of the crucible. One of the conditions requisite to the production of a large proportion of the higher grades of foundry iron is almost absolute uniformity of temperature of the lower parts of the furnace. The crucible and boshes seem to acquire certain shapes or proportions by graphitic accumulations, without which uniform grades of No. 1 and No. 2 x iron can scarcely be made. Time is required to form these accumulations of graphite, &c., but they are quickly and easily disturbed, and the disturbing cause seriously affecting the product of foundry iron. The use of magnetic ores exclusively renders these disturbances more frequent and less subject to control, owing to the difficulty of thoroughly de-oxidizing them before reaching the crucible. With magnetites forming the burden the rapidity of travel of the stock in the furnace needs to be very carefully watched and the composition of the slag kept as uniform as possible. Any considerable variation in slag, or too rapid or too slow driving (variations that would pass unnoticed with easily reducible ores) are reasonably sure to produce marked changes in the furnace running on dense magnetites.

The objections to structure do not hold good so far as the soft earthy magnetic ores are concerned. These ores, on the other hand, usually carry considerable sulphur, an element which is well known as an unrelenting enemy of foundry irons. When present in the dense class of magnetic ores, it entirely unfits them for the economical production of foundry iron. When thoroughly washed, however, these form fairly good mixtures, as the washing not only removes the sulphur, but also opens the structure of the ores, rendering them porous and easily attacked by the blast furnace gases. Brown hematites and red oxides rarely carry sulphur to any considerable extent, which alone is a decided advantage in their favor in competition with magnetic ores.

Soft magnetic ores, free from sulphur, are fairly well adapted for making foundry grades; with these forming a large part

of the burden no particular difficulty is experienced in making open-grained iron; this would indicate that the difference in chemical constitution between the magnesia and the red oxides is not responsible for the greater difficulty experienced in reducing magnetites.

The grain or fracture of foundry iron by which it is graded does not always indicate how it will work after remelting. The writer has seen large, dark grained and evenly crystallized iron condemned because it ran hard in small thin castings. The fracture of the iron was all that could be desired, and it also had the soft appearance that is familiar to the expert but difficult to describe. This iron proved hard in small castings, owing to the low percentage of silicon it contained (from 0.6 to 0.8 per cent.), and even when melted, without the addition of any scrap, would form a slight chill or hard shell on the surface of a casting in immediate contact with the mold. Experiments in the pig beds showed that this metal gave from $\frac{1}{8}$ -inch to $\frac{1}{4}$ -inch chill as tested in Whitney chill cups.

Foundry irons made exclusively of magnetic ores, whether they be close and dense of structure or of the soft, earthy varieties, are apt to show this tendency more or less; it is this want of uniformity that renders them undesirable for general foundry work, except as mixtures to strengthen the softer or weaker irons. While low silicon in the pig iron is undesirable for foundry grades, yet for mill irons this quality becomes valuable. Hence for the best brands of either grade the average consumer of foundry iron will consult his interest in purchasing his standard iron from furnaces making a specialty of this branch of the business, while the mill manager will avoid the forge grades made by the foundry furnaces and seek his supply of best iron from those blast furnaces making a specialty of mill or gray forge pig iron.

As a rule the gangue of magnetic ores contains but little free quartz or sand, the silicon is usually in combination with alumina, lime or magnesia, and the slag to this extent is partially made, so that the limestone flux added to the ore charge to produce slag of certain composition combines with the gangue of the ore more readily and at lower temperatures than when the gangue is chiefly quartz and sand. In consequence the iron made is less liable to contain reduced silica.

Other causes affect the percentage of silicon in the pig—but they pertain more to the management of the furnace itself than to the ores smelted. Large furnaces and super-heated blast permit of the production of high silicon foundry iron without particularly affecting the economy of the work. The low silicon foundry irons made from magnetic ores give varying results in the foundry, depending upon the knowledge of foremen of the melting departments; these irons, when also low in phosphorus, require more fuel to melt them and to run them as fluid as irons rich in silicon and phosphorus, but the difference in cost of fuel per pound of iron melted is but trifling. While this fact is known to many founders, others conduct their cupolas without regarding the different requirements of irons of various compositions, and as a result many imperfect castings are charged to the iron used when the fault really lies in the management of the cupola.

The grading of foundry iron is troublesome and annoying, as conditions altogether independent of chemical composition change the grain or fracture by which the pig iron is graded, bought or sold. Attention has lately been called to this subject, and I have only to add that frequent mistakes are made at the furnace by breaking and grading pig iron when too warm. Sample pigs are usually taken from about the middle of each bed of the cast. The

pigs should be cold—the temperature of the atmosphere. If only moderately warm the grain will show larger, darker and more even crystallization than when broken entirely cold. If a pig is broken warm and then broken again after losing all its heat the first fracture may show No. 1 grade, while the second, even within a few inches of the first, will be only No. 2, or silver gray. All irons do not alter to the same extent; possibly the higher the silicon and phosphorus the more difference there is in the appearance of the fractures of the same pig broken warm and then cold.

Torpedo Boat Boilers and Engines.

In an interesting article on "Torpedo Boats," contributed to *Industries*, Mr. E. H. Parker says that in all recent constructions of the torpedo boat the locomotive type of boiler has been adopted in order to obtain the highest efficiency in the smallest possible space. As an example of the proportions of the modern boiler employed for this purpose, the particulars of No. 80 of the British Navy may be quoted. This vessel is the fastest in the navy, with an average speed of 23 knots, and her dimensions are 135 feet long by 14 feet wide. This boat is fitted with a locomotive boiler, having a single fire-box, a grate surface of about 46 square feet and a heating surface of about 2300 square feet. Steam is supplied to a set of engines indicating 1650 h.-p., with forced draft, which is equivalent to 40 i. h.-p. per square foot of grate surface. In ordinary merchant steamers only from 8 to 10 i. h.-p. per square foot of grate surface is obtained with natural draft and from 16 to 20 i. h.-p. with forced draft. The chief difficulty with the boilers of these boats has arisen from the high pressure of steam which is usually employed—viz., the rupture of the tubes at their junction with the tube plate. The danger incident upon such a breakage has been considerably diminished by an ingenious device invented by Mr. Yarrow, of London. According to this method the air forced from the fan is made to pass through light non-return valves, which are arranged so that if the flame or steam from any cause has a tendency to rush back, the valves immediately close and cut off communication between the boiler and stokehold.

Economy of fuel is a secondary consideration in torpedo boats. The average consumption at full speed varies from about $3\frac{1}{4}$ pounds to 4 pounds per i. h.-p. per hour. In boats built by Monsieur Augustin Normand, these figures have, however, been very much reduced. With a torpedo boat 124 feet long, a coal consumption of 2.45 pounds per i. h.-p. per hour was recorded. The above table gives the results obtained from long duration trials with six boats built by M. Normand & Co. At the close of last year Messrs. Doxford & Co., of Sunderland, England, completed a torpedo boat in which the furnace is supplied with liquid fuel. In the preliminary trials, the results obtained are said to have been of a satisfactory character. There is one advantage which liquid fuel possesses over coal—that is, with a given weight there is a greater endurance or radius of action. On the other hand, its application in war vessels would involve a serious risk, on account of the possibility of an explosive penetrating the oil tank.

The object which the engine builder has in view is to obtain the greatest propelling power with the least weight of engines, boiler and driving gear. In the earlier first-class boats, the power realized was from 35 to 36 i. h.-p. per ton weight of machinery. In recent boats of the same class, from 40 to 41 i. h.-p. per ton weight of machinery has been obtained. There are also torpedo boat chasers with engines

of 3000 i. h.-p., and weighing only 112 tons, which is equivalent to 27 i. h.-p. per ton weight. In the Sharpshooter, which has been recently completed, the engines drive twin screws, and they develop 4500 i. h.-p. This power is deemed sufficient to attain a speed of 21 knots per hour. The total weight of the propelling machinery, including engines, boilers, water, &c., does not exceed 165 tons, which is equivalent to more than 27 i. h.-p. per ton weight. The small space occupied by the engines is worthy of notice. In the twin screw torpedo boat Ariete, built by Messrs. Thornycroft & Co., each engine develops 760 i. h.-p., and occupies a ground space of only 5 feet 9 inches by 6 feet. Recent first-class torpedo boats carry not less than nine separate and independent steam engines—viz., (1) The main engines, (2) steering engine, (3) circulating pump engine, (4) engine for electric search light, (5) steam donkey, (6) engine for fan blower, (7) engine for patent condenser, (8) two sets of air-compressing engines.

Fires from Steam Pipes.

The second annual report of the fire marshal of the City of Boston, for the year ending May 1, 1888, contains, among other matters, the following interesting information:

I have been able to satisfactorily trace the origin of but five fires during the year to steam-pipes, and the circumstances surrounding these in no way tend to show that wood, in its normal condition—i. e., when free from any previous desiccation, is in danger of becoming ignited in this manner. In other words, ignition in said cases appears to be merely a certain species of what is popularly termed "spontaneous combustion," the steam-pipes themselves being merely one of many indirect factors which often assist in producing such combustion. Although the subject has been discussed pro and con from the year 1846, when Chief Braidwood, of the London Fire Brigade, first addressed the House of Lords on the topic, to the present time, when the opinions of experienced persons interested in the matter seem to be somewhat conflicting, I find by far the preponderance of evidence in favor of the conclusion that wood, subjected for a number of years to the heat of steam-pipes, may eventually reach such a state of carbonization as, with the addition of moisture, exposure to a draft of air, or under the influence of friction, caused by expansion and contraction of the pipes, may break into flame. As the ignition point of ordinary pine wood has been determined, by experiment, to be 700° F., it is evident that this must be reduced by some process, in order to admit of its taking fire at 292°, the temperature of steam under a pressure of 60 pounds.

I have found one of the most frequent causes of fires, which are indirectly traceable to steam-pipes, to be the self-ignition of dust, fluff, small pieces of paper, waste, &c., which seem especially attracted to the neighborhood of inclosed steam-pipes through almost imperceptible crevices. In several such instances the fires have been fortunately discovered and extinguished before doing any harm. P. A. Montgomery, secretary of the Western Manufacturers' Mutual Insurance Company, in special report No. 5 of the Manufacturers' Mutual Insurance Company refers to this same element of danger and suggests, as a remedy, the use of a funnel-shaped casting, cast in two parts, from 3 to 6 inches in height, fitting close at the top, and screwed to the floor, where the pipe passes through; and he further recommends that a thimble of some non-combustible material should be put through the hole in the floor or partition and se-

curely fastened on either side, in order to protect the wood from contact with the pipe.

The light sheathing by which the pipes are often covered, being obliged to constantly absorb the confined steam heat, is extremely liable to reach a dangerous ignition temperature. Sheathing reduced to such condition by being in close contact with the pipe, and so placed as to be susceptible to more or less friction caused one of the five fires herein referred to; another was caused by lumber dust in the dry-house of a planing mill sifting through the floor on to the pipes. The desirability of employing some sort of non-combustible covering for steam-pipes, to prevent their contact with wood, dust, &c., is apparent. They should never be inclosed in wood sheathing. Professor Gibson, in a report to the Manufacturers' Mutual Insurance Company, gives an exhaustive and instructive treatise on the merits of the various kinds of coverings.

Another danger from steam-pipes is the favor with which they are apparently looked upon as offering a desirable neighborhood for the location of rats' nests, in which the phosphorous matches and bits of waste often found therein are in danger of becoming impregnated with the necessary amount of heat essential to the production of spontaneous combustion.

B. P. Hutchinson, or "Old Hutch," as he is familiarly called, is supposed to rule in the Chicago Board of Trade. As promoter of the great wheat corner which culminated last week, after forcing the price up above \$1.50 per bushel, in the effort to squeeze the "shorts," this bold speculator gained a wide notoriety. On Thursday he drew out of the clearing house a check of \$675,000, as his profits on the sales of the day. As described by a correspondent, his favorite way of trading is to pass his card around the pit, with the remark, "Here, boys, put down what you want to buy or sell; I'll accommodate you." He will make trades, and realize on a fluctuation of a sixteenth of a cent. Some days when the humor seizes him he will hold the market within narrow limits and enjoy the discomfiture of the chronic bulls and bears, who vainly endeavor to get prices out of the rut. There are times, however, when the market gets beyond him, and his heaviest trades have no more than a temporary effect. During the late advance a sale of several million bushels stopped the upward movement temporarily, but that was all. More than once he has come to the rescue of the market and prevented it going to pieces. Then, again, as was the case a year ago last June, when the Harper wheat corner broke, he delighted in tantalizing those who had the good of the market at heart, and keeping them and the market on the ragged edge of anxiety. His transactions run up into the millions every week. He is equally at home in wheat, corn, oats or provisions, and no particular pit is favored. He runs them all. There are times, of course, when Armour steps in, but the old man is not even afraid of Armour, with his \$50,000,000.

Messrs. Marchultz & Cantrell, National Iron Works, San Francisco, Cal., are engaged on plans for a new brick machine shop and foundry to be erected on the site of their old works.

The Ohio Valley Foundry, in Bellaire, Ohio, was burned on Sunday. Loss, \$60,000; insurance, \$29,000. The Bellaire Window Glass Works, adjoining, were damaged to the extent of \$10,500. The fire was caused by a natural gas explosion.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., October 2, 1888.

The past week has developed no new features, although it has confirmed the favorable anticipations expressed in recent reports from this office. A large amount of business has been arranged for, and in most cases at steadily advancing prices. The heaviest portion of the orders was taken at low figures, and a fair amount was also taken at advanced rates, but very little has been done so far at to-day's asking prices, although if it becomes absolutely necessary to place orders immediately sellers will doubtless gain their point. Appearances indicate, however, that the most urgent requirements have been satisfied, and both sides are in a position to wait for further developments. The chances are, therefore, that the volume of business will be comparatively light, as buyers see no object in placing orders at advanced prices until they are forced into it, and by the same rule sellers are not inclined to shade their prices until they have more iron than can be delivered on back orders, which is not the case at present.

Pig Iron.—A somewhat irregular, but firm, market has been met with for some time past. As a rule prices are higher, but not in all cases. Limited quantities of good brands can still be had at \$16, \$17 and \$18, at tide, for the three grades, while others of probably very similar quality command about 50¢ more, and those of a specially favorable character command still higher prices, say, \$17 for Gray Forge, \$18 for No. 2 Foundry and \$19 @ \$19.50 for No. 1. All depends on what the buyer requires, quantity, quality, delivery, terms of payment, &c. As a rule there is no doubt that the market is in much better condition than it has been for months past, and, from the lowest point, prices are easily \$1 per ton higher; in some cases more than that. The outlook is also very satisfactory and seems to promise activity and firmness all along the line. The general opinion is that prices are not likely to show much change until after the coming elections. Referring once more to the current quotations for Pig Iron, it may be said that for small lots \$16.50 for Gray Forge, \$17.50 @ \$18 for No. 2 and \$18.50 @ \$19 for No. 1 are fair average prices. Large consumers bought heavily last month at less money, so that there is no demand, except for small lots, and no supply more than is being absorbed from week to week, either on old contracts or on new orders at advanced prices.

Blooms.—Good demand at quoted rates, which are about as follows: Nail Slabs, \$29 @ \$29.50, at mill; Billets from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29.50 @ \$30.50 for Nail Slabs; \$34 @ \$36 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There is a good deal of inquiry, but the offerings are light, and at firm prices, say \$28.50 @ \$29 at mill, or \$29 @ \$29.50 delivered. Consumers do not take to these prices very willingly, but from present appearances they will have to do so, as sellers are in a strong position and show no inclination to make concessions.

Bar Iron.—This long depressed department of the iron trade has wonderfully improved during the past couple of weeks. Large orders have been secured, and, as noted last week, prices advanced

to 2¢ for lots from store, and in some cases mills are also quoting 1.95¢ @ 2¢ firm. But some of the mills would probably take 1/16¢ less, so that 1.85¢ to 1.95¢ is nearer the actual selling price for large lots. Some orders for Car Iron (variously estimated at from 2500 to 4000 tons) were taken at figures not over 1.82 1/2¢, in some cases less than 1.8¢, but new business for similar iron, it is thought, could not be placed to-day at less than 1.85¢ @ 1.9¢, but it remains to be seen whether these figures can be realized in actual transactions. Besides orders from the car builders, Wrought-Iron Pipe manufacturers have been heavy buyers of Skelp Iron, so that the majority of mills have all the business they can handle for some time to come. Last sales of Grooved Skelp were at 1.9¢, and that would be an inside figure to-day, and from 2.05¢ to 2.15¢ for Sheared Skelp. Now that these orders have been placed, there may be a period of comparative dullness, but sellers appear to be in a strong position, and are not likely to shade prices to any extent until they need orders more than seems likely in the near future.

Plate and Tank Iron.—This branch of the trade does not keep pace with the one just commented upon. There is a fair demand, and mills are moderately well employed, but the majority would still like a few more good orders at quoted rates, and would perhaps shade a trifle to very desirable parties. The outlook is considered to be very encouraging, but as regards actual business, it is as yet more in anticipation than in definite orders on the books. Prices about as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3 1/4¢; Fire-Box, 3 1/4¢ @ 4 1/4¢.

Structural Iron.—The same remarks would apply as in the foregoing paragraph, although it is felt to be reasonably certain that full employment will be found during the coming winter. There is a good deal of business in hand already, but a good deal more will be required to keep all the mills running to their full capacity, but, as we have said, the chances appear to be very favorable. Prices about as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand has been quite active of late, and while prices are firm it has not been found practicable to make any advance thus far. Mills are running to their full capacity, and find no difficulty in placing their entire output. Quotations are as follows:

Best Refined, Nos. 26, 27 and 28....3 1/4¢ @ 3 1/2¢
Best Refined, Nos. 18 to 25....3¢ @ 3 1/4¢
Common, 1/16¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28....4 1/4¢ @ 4 1/2¢
Best Bloom Sheets, Nos. 22 to 25....4¢ @ 4 1/4¢
Best Bloom Sheets, Nos. 16 to 21....3 1/2¢ @ 3 3/4¢
Blue Annealed.....2.8¢ @ 3¢
Best Bloom, Galvanized, discount.....62 1/2¢
Common, discount.....67 1/2¢

Steel Rails.—There is more inquiry for rails, but not much actual business has been taken of late. For fall and winter delivery \$29 at mill is quoted, although concessions might possibly be had on very desirable orders. Manufacturers are very cautious in quoting for next year's deliveries, as the cost of production is increasing and present prices are too low to permit of any risks being taken. Probably \$30 might be quoted for that delivery on moderate-sized lots.

Old Rails.—No business to report in this market. There are bids of \$23 for spot T's, with sellers at \$24 for shipment or \$24.50 for lots in store.

Scrap Iron.—Market firm and moderately active, but without change in prices,

which are about as follows: \$20.50 @ \$21 for cargo lots; \$21.50 @ \$22 for carload lots, delivered, or for choice \$22.50 @ \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought Iron Pipe.—The mills are all very busy, the bulk of the demand being for the smaller sizes. Prices continue firm, and are generally adhered to. Discounts are quoted as follows: Black Butt-Welded, 55¢; on Galvanized do., 45¢; on Black Lap-Welded, 65¢; on Galvanized do., 52 1/2¢; on Boiler Tubes, 60¢.

Nails.—A slightly improved demand is the only feature worthy of note. Prices do not improve to any extent, although mills are looking for an advance at an early date and say it would prove beneficial to the trade at large, and claim that at the prices now ruling it would pay better to stop the machines. We quote \$2 for small lots from store, with the usual discount on large quantities.

By Telegraph.—The market for Bars and Skelp Iron shows increasing strength and activity; a large amount of business is offered at full prices, but sellers now ask 2¢ for Skelp.

E. J. Etting, of Philadelphia, has been appointed agent for the sale of Wire and Wire Rope made by the Trenton Iron Co., of Trenton, N. J. Quotations on application to Mr. Etting, 222 South Third street, Philadelphia.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, October 1, 1888.

Pig Iron.—The condition of business has been very much the same as the preceding week. Buying was largely confined to small-lot orders. One sale of 2000 tons Charcoal Iron for Car Wheels is reported. The period of delivery covering ten months forced the purchaser to pay a small advance on prices for immediate shipment. Furnacemen do not anticipate much change in the prices of iron for this year's delivery, but, at the same time, are not willing to make additional contracts at prevailing figures when deliveries extend beyond December. Some furnaces have contracted so far ahead that they claim to be temporarily out of the market. There is no anxiety on the part of sellers to take orders, at least not enough to offer concessions to buyers who are still in the market. Freight rates from Mahoning and Shenango valleys to Chicago have been advanced 15¢ per ton, taking effect to-day. This will have no direct effect upon business or prices, as the advance was anticipated on late sales and former rates on existing contracts protected by railroads. The Southern Coke furnaces have adopted the system of grading which is used by all Northern furnaces and announce that all shipments on and after October 1st will be made under the new schedule. We change our nomenclature to correspond with the circular published elsewhere. We make the following cash quotations, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$19.50 @ \$20.50; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband) No. 1, \$19 @ \$20; other Ohio Scotch Irons, No. 1, \$18 @ \$19; Lake Superior Coke, No. 1, \$17.50 @ \$19; No. 2, \$17; No. 3, \$15.50 @ \$16; Southern Coke, No. 1 Foundry, \$17.75 @ \$18; No. 2 Foundry, \$17 @ \$17.50; No. 3 Foundry, \$16.75; No. 1 Soft, \$17.25; No. 2 Soft, \$16.75; Gray Forge, \$16.25.

Bar Iron.—The demand is principally for small lots both from consumers and country dealers. From the latter mixed orders covering a variety of articles not classified as Bar Iron, to make up a carload, are very common among large jobbers, one house reporting an average of 8 to 10 cars a day. Large buyers are either supplied or waiting for future events. It is said that the mills are full of work and stocks in jobbers hands in good shape, but not large. Prices are quoted at 1.90¢ in carloads and 2¢ in small lots from store. Mill price, Chicago delivery, range from \$1.75 to \$1.80 to most of the trade, and claims of weakness made by some who wish to place orders.

Structural Iron.—The season is so far advanced that new business is confined to small lots from stock and deliveries under contract. Mill prices f.o.b. Chicago are: Angles, 2.25¢; Universal Plates, 2.25¢ @ 2.30¢; Tees, 2.50¢; Beams and Channels, 3.40¢. Store prices: Angles, 2.40¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—Some improvement in the demand for Heavy Sheets is noted, though orders, as a rule, are for small lots at full market prices. No new features are mentioned in connection with the trade on Plates and Tubes. Store quotations are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 62½¢ off.

Sheet Iron.—It seldom occurs that this market is not well supplied with Light Sheets. In fact, the supply has usually been so abundant that consumers gave themselves no concern about obtaining material in advance of their requirements. The condition, however, is very different this fall. Buyers are searching in every quarter for stock that cannot be had. Jobbers who are regularly receiving a portion of their supply under contract say that it is distributed as fast as it comes in, never remaining long enough in their hands to be stored. All numbers are scarce, but No. 26 seems to be most wanted and the most difficult to obtain. On recent inquiries mills quoted on a basis of 3.30¢ for No. 27, Chicago delivery. Jobbers' prices from store are 3.20¢ for No. 24; 3.50¢ for Nos. 25 and 26 and 3.40¢ for No. 27.

Galvanized Iron.—The volume of trade continues to be very large, but the broken line of stock is a menace to increasing the business to still greater figures. In dull times the special brands have the preference with consumers at a shade higher prices, but in the present condition of the market all good Iron is in demand and commands the same price. The quantity of Iron consumed by the Cornice trade this season is much less than for several years previous. Out of store jobbers quote Juniata at 60% off and Charcoal at 60% and 5% off for small lots.

Merchant Steel.—The immediate future gives no promise of buyers for general consumption breaking loose from their established policy of ordering small lots of Steel as they need it. Implement manufacturers having placed their orders for the year's supply, business resumes the old rut of a half-alive trade and irregularity in prices. Regular store quotations are as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢. The above prices are frequently shaded. The demand for Plow Steel in special shapes this season has been considerably above the average.

Steel Rails.—Small lots aggregating perhaps 10,000 tons were booked in this market during the past week for delivery this fall. Negotiations have been opened with some roads for Rails to be delivered in the early part of next year, but no sales are reported. It is rumored that one mill offered to accept an order for 5000 tons, March, 1889, delivery, at less than \$30 per ton. The statement has neither been verified nor denied. If true, it is reasonable to suppose the low figures were made for the purpose of securing enough work to keep their mills in operation during the winter months. Rail-makers here repudiate the statement published in the daily press that the American Association contemplate forming a combine with foreign manufacturers. Mills continue to quote as a nominal price \$30 @ \$31.

Old Rails and Wheels.—Dealers report that there were no transactions in Old Rails during the past week. On one lot of 500 to 1000 tons \$24, Chicago, was offered and refused. Holders are asking about \$24 at yard, and mills are unwilling to pay more than \$24 at mill, one buyer having offered \$23, Chicago, the rate of freight being 75¢ between this and the point of consumption. The demand for Old Steel Rails has also been very light. Nominal quotations for long lengths are \$19.50; Short Ends, \$16.50. Car-Wheels are reported very scarce and the market quiet. Quotations range from \$19 to \$20, according to the selection.

Scrap Iron.—Few transactions in the Scrap market have occurred. Prices asked by dealers are somewhat higher than mills feel warranted in paying. The demand does not seem to be very urgent, and both sides are holding pretty firmly to their ideas. We make the following quotations per ton of 2000 lb: No. 1 Forge, \$19.50 @ \$20.50; Track, \$18.50 @ \$19.50; No. 1 Mill, \$14.50 @ \$15; Tank and Pipe, \$13; Sheet, \$9.50; Horseshoes, \$19; Axles, \$25; Cast Machinery, \$14.50; Stove Plate, \$11; Cast Borings, \$8.75; Locomotive Tires, \$16.50; for Mixed Country Scrap dealers offer \$13.50 @ \$14.

Hardware.—Business among the larger jobbing houses continues to be very active. Competition has become quite strong and those who have the most adequate means of purchasing goods and canvassing the trade are reaping the greatest benefit from the season's business. The demand for fall goods started up at least 30 days earlier than usual, but it does not now look as though this would bring a decline in the demand any earlier than in former years. The excellent crops and the recent great advance in the price of wheat in this market are being felt throughout the Northwest. The impression prevails that the advanced prices for grain will continue during the winter and give to consumers a better supply of money than they have had for a long time. While there is a general hardening of prices all along the line, Lead and Tin and articles in which they are largely a part of the manufacture are most conspicuous in the advance. Prices have been fairly well supported during the entire season, and business in the aggregate has been much better, notwithstanding frequent cuts on specials or leaders.

Nails.—The demand for Nails at this season is a little disappointing. Trade is referred to as being lighter than for several years before, though prices continue to be pretty well maintained. Steel Cut Nails are quoted at \$2.05 @ \$2.10, carload lots, and \$2.15 from store, in small lots. Wire Nails, \$2.50 @ \$2.60. The Paralle! Chisel Pointed Nail is beginning to be recognized as a factor in the trade for which there is considerable demand for sample lots. Manufacturers quote \$2.50 rates, Wire Nail card.

Barb Wire.—The condition of the market remains unchanged. The demand continues very light and only for small quantities. The stocks in manufacturers' hands are large, but those in the hands of jobbers are lighter than usual. Quotations are nominally 2.90¢ for Painted and 3.65¢ for Galvanized.

Pig Lead.—Consumers have taken a trifle more interest in the market during the week and prices ruled steady at 4.90¢ @ 4.95¢ for October delivery.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, October 1, 1888.

The opening up of nearly all the channels of transportation, which has occurred during the past two or three days, has given a stimulus to business, and trade in nearly all lines has resumed, practically, its normal condition. There is now no interruption in traffic between this point and any of the trade centers of the South, with the exception of perhaps one or two in Florida, and a few days will probably remove them. Merchants and railroads are already beginning to feel the beneficial effects of the unusually large crops that have been raised throughout the entire South, and from the present time forward there is every likelihood of a period of great activity in all lines of business. Many of the railroads have, during the present year, endeavored to fortify themselves on the question of transportation by adding very much to their rolling stock, but still the deficiency is very great, and some of the largest furnaces are beginning to be inconvenienced for want of cars to haul their stocks and take away their products.

Pig Iron.—There is no particular change to note in this article. The demand is fully equal to the output of the furnaces, and prices are being well maintained. The local demand fell off slightly during the past two or three weeks, but there is no doubt that it will soon assume its usual proportions, as there are now no practical obstructions in the way. From inquiries that are being received from Southern foundries it is fair to presume that the consumption from this quarter will considerably exceed any former period, as the winter months are generally the most active with them. The Western markets appear still to be the most favorable ones to which the Southern furnaces can ship their output, although the East is not behind in their requirements. There have not been the large transactions that have characterized the trade in times gone by, but sales are confined more to small round lots, and inquiries from speculators have not been as frequent as they were some weeks ago. Upon the whole, the market is in a very satisfactory condition, and the furnaces are being kept comfortably sold ahead on current demands.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts.,
CINCINNATI, October 1, 1888.

Pig Iron.—In general the local market for Pig Iron has been quiet, yet the volume of business has not been small, and a few large buyers are reported to have entered the market quietly, made several large contracts and retired, without knowledge by the trade at large of their presence. A confident tone has prevailed, but there has been no advance in market prices. There is scarcely a new feature in the Iron interest proper upon which to dwell; sellers are satisfied for the time being, and buyers are not anxious. Transportation rates from Southern furnaces to

points on and north of the Ohio River have been advanced 15¢, and some purchases and contracts have been made recently at the old schedule. The local money market is extremely easy, unusually so for this season. Among the sales, in addition to the large contracts previously referred to, are 800 tons of Southern Car-Wheel Iron, 100 tons per month for eight months, at \$24.50, cash, and \$25, four months' time; 500 tons No. 2 Southern Foundry, at \$16.50; 600 tons No. 1 Mill at \$15.25, and moderate amounts No. 2 Mill at \$14.50 per ton, cash. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$17.50 @	\$18.50
Southern Coke, No. 2.....	16.50 @	17.50
Southern Coke, No. 3.....	15.50 @	16.00
Ohio Soft Stone Coal, No. 1.....	17.00 @	17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @	16.00
Mahoning and Shenango Valley.....	17.50 @	18.50
Hanging Rock Charcoal, No. 1.....	20.50 @	22.50
Hanging Rock Charcoal, No. 2.....	19.50 @	22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @	19.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @	18.00
Forge.		
Strong Neutral Coke.....	14.75 @	15.25
Mottled Neutral Coke.....	13.50 @	14.00
No. 1 Mill Coke.....	15.00 @	15.50
No. 2 Mill Coke.....	14.50 @	14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	23.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @	21.50

Manufactured Iron.—There has been an increased volume of business and a much stronger tone. The orders from Stove manufacturers are liberal and the demand for Sheet Iron is especially active. One thousand tons Bar Iron sold at 1.70¢ at the mill. Full prices on all kinds are now realized, and an advance is imminent. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ per lb.

Nails.—The market has ruled strong in tone, in sympathy with Pig and Manufactured Iron, and a fair volume of business has been transacted. Jobbing prices are based upon 12d @ 40d, which sell at \$2.10 per keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 per keg.

Old Material.—The market has been unsettled; the offerings of Old Wheels have been freer and prices have declined. At the close it would be difficult to sell Old Rails at \$23.50, but several days ago this rate was bid here, and sales were made in St. Louis at \$24, cash. Old Wheels have met less inquiry, but the offerings are not large; the nominal quotable rate is \$19 @ \$20, spot cash.

Louisville.

LOUISVILLE, KY., October 1, 1888.

Pig Iron.—The market has remained steady during the past week. Sales of Iron in small lots have been made, with no large transactions to report. It is thought, however, that during the next two or three weeks the market will be more active and that prices will slightly advance. The contemplated change of names to designate the grades of Southern Irons in accordance with other localities takes effect October 1. Fifteen furnaces have agreed to follow out this plan, which, it is thought, is an advantageous one. Old Rails continue active, prices being held firm at \$24. Old Wheels at \$21. It was thought that the trouble in the South over yellow fever would curtail the production of Pig Iron, but furnaces have continued to run steady, and the output has been fairly good. We quote as follows:

Southern Coke, No. 1 Foundry.....	\$17.00 @	\$18.00
" No. 2.....	16.00 @	16.50
" No. 2½.....	15.50 @	16.00
Hanging Rock Coke, No. 1 Foundry.....	17.25 @	17.75

Hanging Rock Charcoal, No. 1 Foundry.....	21.00 @	23.25
Southern Charcoal, No. 1 Foundry.....	18.00 @	18.50
Silver Gray, different grades.....	14.50 @	15.25
Southern Coke, No. 1 Mill, Neutral.....	14.75 @	15.25
" No. 2.....	13.75 @	14.75
" No. 1 " Cold Short.....	14.25 @	14.75
" Charcoal, No. 1 Mill.....	15.75 @	16.50
White and Mottled, different grades.....	13.50 @	13.75
Southern Car-Wheel, standard brands.....	23.00 @	24.00
Southern Car-Wheel, other brands.....	19.25 @	21.25
Hanging Rock, Cold Blast.....	22.25 @	25.25
Hanging Rock, Warm Blast.....	19.25 @	20.25

Cleveland.

CLEVELAND, October 1, 1888.

Iron Ore.—The market has lost some of its activity by reason of the fact that the Hard Ores are nearly all sold up and buyers are hesitating about paying the advanced price for other brands. Ore consumers in the East are making heavy demands, and are said to have purchased 25,000 tons of non-Bessemer Hematites at \$4.40, the same Ore having sold at the opening of the season for \$3.75. Additional sales of a second-class grade of Bessemer Ore have also occurred, the price paid being 60¢ in advance of midsummer quotations. Transportation rates have advanced another point, and the consequent addition in the cost of Ore at the mines causes buyers to hesitate about taking Ores that would be eagerly purchased at 30¢ per ton less. Furnacemen insist that the condition of the Iron market does not warrant them in paying high prices for Ore. There is little doubt, however, about the sale of all the Ore mined. With all the advances made during the past three weeks, prices for Ore are still \$1 below those prevailing at a corresponding period last year. The season's shipments closely aggregate 3,310,000 tons, and will undoubtedly aggregate 4,000,000 tons by December 1.

Pig Iron.—Mahoning and Shenango Mill Irons have advanced 50¢ per ton, and a still further increase in price is anticipated. Select Foundry is bringing \$18, and Mill Irons are quoted at \$16, cash. Dealers report the market very firm, with an upward tendency all around, although Lake Superior Charcoals are somewhat weak.

Manufactured Iron.—Structural Iron sells very freely. Bar Iron at \$1.70 is in excellent demand, and Sheets at \$3.10 for No. 27 are eagerly inquired for.

Scrap Iron.—Old American Rails are still held at \$25, and, although a few scattering sales are reported, there is a general belief that such a price cannot be much longer maintained.

Nails.—Steel Wire Nails have advanced a point, but local dealers have cut common Iron Nails to \$1.90, and Steel Nails to \$2 per keg. Cut Iron Spikes have advanced to \$2.50, and Steel spikes to \$2.75.

Detroit.

WILLIAM F. JARVIS & Co., under date of October 1, report as follows: While the market has shown no signs of weakness during the past week, the volume of business has been a little under that of the previous one. The demand for 50 to 100 ton lots has been up to the average, but no very large sales have been made. Car-Wheel Irons are in the best demand, and more inquiries are received for high numbers than is usually the case, thus showing that Old Car-Wheels are scarce, and what few lots are offered are held at from \$1 to \$1.50 per ton above price of regular brands of L. S. Charcoal. With a quiet but firm market we quote as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @	\$20.50
Lake Superior Coke, all ore.....	19.75 @	20.25
Lake Superior Coke, cinder mixed.....	18.50 @	19.00
Standard Ohio Black Band.....	19.75 @	20.25
Southern No. 2.....	17.75 @	18.25
Southern Gray Forge.....	16.25 @	16.75
Southern Silvery.....	17.00 @	17.50
Jackson County (Ohio) Silvery.....	16.50 @	17.00
Old Wheels.....	20.50 @	21.50

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave., Pittsburgh, October 2, 1888.

River navigation is again suspended, which, of course, restricts business somewhat; but it is not a matter of so much importance now as it was some years ago, before we were so well supplied with railroads. It will not be many years before the Ohio River is slack-watered all the way from Pittsburgh to Cincinnati, a distance of almost 500 miles; and once it is, the Ohio Valley will be filled with manufactories; as it is, this great valley is becoming noted more and more every year for her manufacturing interests. In addition to Iron, Steel and Glass, the potteries of East Liverpool and brickyards of New Cumberland are looming up. Nearly all manufacturers between Pittsburgh and Wheeling are supplied with natural gas, and, in not a few instances, at a less price than the Pittsburgh manufacturers have to pay. Here the cost of gas has been almost doubled within the past year, and some consumers have gone back to coal.

Pig Iron.—There has been no important change in the situation during the past week. Business continues quiet as compared with what it was a few weeks ago, but still there is a very fair degree of activity. The outlook indicates that there will be a good, healthy trade for some time to come, and the apprehension entertained of a speculative movement has subsided. There is some Iron held on speculation, but it does not amount to much, and is not likely to have any effect upon the market. Some furnacemen refuse to sell to speculators. We quote prices as follows:

Neutral Gray Forge.....	\$15.50 @	\$16.50	cash.
All Ore Mill.....	16.75 @	17.50	"
White and Mottled.....	15.00 @	15.50	"
No. 1 Foundry.....	18.00 @	18.50	"
No. 2 Foundry.....	17.00 @	17.50	"
No. 1 Charcoal Foundry.....	24.00 @	24.50	"
Cold Blast Charcoal.....	25.00 @	27.00	"
Bessemer Iron.....	18.00 @		"

Included in the sales reported was a lot of 12,000 tons Gray Forge, standard brand, for immediate delivery, at \$16.50, cash, but this is an outside price; brokers state that they have very good Irons to sell at \$16.25, and even \$16, cash. We can report sales of some 3000 tons Bessemer, at \$18, cash.

Muck Bar.—There is less inquiry, and, while prices remain unchanged, the market is weaker; we continue to quote at \$28.50 @ \$29, cash, as to quality, delivery, &c. There is nothing like the demand there was a few weeks ago.

Ferromanganese.—Sales of 80 ¢ at \$55.50, cash; Speigel quoted at \$28.50, cash, for 20 ¢.

Manufactured Iron.—There is a continued fair degree of activity. Orders are still coming forward pretty freely, and the mills generally are pretty well employed. Some of them have all they can do. Manufacturers continue to complain that prices have not advanced sufficiently to cover the enhanced cost of the raw article, and it was this more than anything else that arrested the upward course of the latter. We continue to quote Bars at 1.80¢ @ 1.85¢; Plate, 2.20¢ @ 2.25¢, and No. 24 Sheet, 2.80¢ @ 2.85¢; Skelp Iron is in good demand, and prices are quoted steady at the recent advance—Sheared: 2.12¢ @ 2.15¢, Grooved, 1.85¢ @ 1.90¢.

Nails.—There is a continued fair business, although the factories here are by no means busy, but it is all possibly that we can reasonably expect at this particular time and under existing circumstances. So far as we can learn, full card rates are still being realized, and there is no room to cut, as the cost of Nail Plate has gone up fully \$1 per ton. Pittsburgh manufacturers are refusing to make any concession whatsoever from the card, and there is

reason to believe that Wheeling manufacturers are acting likewise. We continue to quote at \$1.90, 60 days, 2 % off for cash.

Wrought Iron Pipe.—There is a continued good demand for small sizes; large sizes continue dull, owing to the fact that natural gas companies are buying very sparingly as compared with former years, as those points near to the gas territories are pretty well "piped." Prices remain unchanged with the exception of Boiler Tubes, which are higher. Discounts on Black Butt-Welded Pipe, 55 %; on Galvanized do., 50 %; on Black Lap-Welded, 65 %; on Galvanized do., 55 %; Boiler Tubes, 62½ % off; 2-inch Tubing, 13¢ per foot net; 5½-inch Casing, 40¢ per foot net, large lots.

Steel Rails.—Heavy sections are still quoted at \$29.50 @ \$30, free on cars at mill.

Billets.—Bessemer Steel Billets are still quoted at \$29 @ \$29.50, cash, delivered on cars at makers' works; sale 1000 tons at \$29 and 500 tons Nail Slabs at \$29. Sales of Bloom and Rail Ends (domestic) reported at \$19 @ \$19.50.

Old Rails.—There has been very little business during the past week; consumers generally are pretty well stocked and for the time are out of the market; however, the offerings are light and prices are fully maintained. We continue to quote American Tees at \$25 @ \$25.25, with some few small sales reported within the range.

Merchant Steel.—There is a fair business at unchanged prices. Tool Steel, standard brands, 8½¢; Crucible Machinery, 5¢; ditto Spring, 4½¢; Open Hearth Machinery, 2½¢.

Railway Track Supplies.—No change reported in prices, but there is a possibility that they might be shaded on a desirable order. Spikes, 2¢, 30 days, delivered; Splice Bars, 1.80¢ @ 1.85¢; Track Bolts, 2.85¢ with square and 2.95¢ with hexagon Nuts.

Old Material.—There is less doing, but prices are maintained. No. 1 Wrought Scrap, \$21, net ton; Car Axles, \$26 @ \$27; Wrought Turnings, \$14.50 @ \$15; Cast Scrap, \$16 @ \$16.50, gross; Old Car Wheels, \$20, gross.

New York.

Office of *The Iron Age*, 66 and 68 Duane street, NEW YORK, October 3, 1888.

American Pig.—The week has been uneventful, sales being on a moderate scale, but at firm prices, though it is reported that some of the Southern furnaces are less sanguine of the immediate future than they have been of late. Reports relating to the condition of consumers vary. The general conclusion, however, seems to be that the majority of them have covered their requirements for the next few months, and that that is particularly the case with those who secured low rates of freight by canal. It is insisted, however, that others have not yet bought all that they need, and their appearance in the market is looked forward to in the near future. Standard No. 1 Northern Iron is still available between the range of \$18 and \$19, while No. 2 is quoted at \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—From Albany and Troy and from New England come reports of greater interest on the part of foundries in those substitutes for Scotch Iron which are chiefly used in the West—that is American Scotch of the Mahoning Valley and the Jackson County softeners. We hear that these are offered at Albany at \$20 @ \$20.75, with reports of shading

under the former figure for some grades. When it is considered that it is necessary to add from 70¢ to 80¢ to the price of tide-water foreign Scotch prices to arrive at the figures for the same point, it will be observed that there is considerable saving to those who use the American product. Some sellers of Scotch Iron in this market are still placing a little at figures which are below the cost price on the basis of present freights. This they are able to do, since they have freight room contracted at lower figures. We quote: Coltness, \$21.75 @ \$22, nominally; Shotts, \$20.50 @ \$21; Langloan, \$20.50 @ \$20.75, and Dalmellington, \$20.25 @ \$20.50.

Spiegeleisen.—Besides a lot of 10,000 tons of 10% closed recently, we hear of sales of over 5000 tons of 20 % Spiegel, for early delivery, all at private terms. A part of this was afloat in sailers, so that low figures could be made. For the same delivery steamer shipment would be necessary, which would cost from \$27.50 to \$27.75. For later delivery, \$27 may be quoted for English. The rise has been due both to high freights on the metal and particularly to scarcity of Ore and high freights thereon. Thus we hear that 19/ was paid for freight on Manganiferous Ore from Spain to Maryport, England. In Ferromanganese similar quotations of freights exist. Foreign is quoted \$55 @ \$56 at tide. We hear of a small lot of domestic 80 % sold by second hands at \$56, delivery Wheeling.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Steel Rails.—There is an evident disposition to keep sales as quiet as possible, and the impression is gaining ground that in reality more has been done than comes to the surface. We hear of sales by Eastern mills aggregating about 16,000 tons, a part of it for early delivery, and also of 20,000 tons sold by one Western mill during the past four or five days. An effort is being made to secure somewhat better prices for delivery in 1889, the aim of the Western mills being \$31 at Chicago, and of the Eastern mills \$29 at mill. We do not hear of any business having been done at these figures. We continue to quote, for winter delivery, \$28 @ \$28.50 at Eastern mill.

Wire Rods.—The only transaction of any consequence reported is a lot of 1200 tons of foreign for the St. Louis market, to be shipped via New Orleans. We quote \$39.50 @ \$40.

Old Rails.—The market has been very quiet, no sales of any consequence being reported during the week under review. It is generally conceded that the feeling is a little less heated, and we hear of at least one lot of Tees being offered at \$23.50. It is evident that the majority of the Eastern and Western mills have pretty well covered requirements for the present, with one notable exception, and it is likely that for the next 30 or 60 days they will hold aloof. We hear that a growing number of trades have been made with Steel mills, which have taken the old material and furnished new Rails to the purchaser.

Scrap.—We hear of the sale of a number of lots, between 200 and 300 tons each, at \$21 from yard, and \$21 delivered to lighter. The market is strong at the close.

Fastenings.—Manufacturers continue to ask \$2.25, delivered, for Spikes. Angle Bars are 2.05¢ @ 2.10¢.

Financial.

Accounts from some sections of the South are rather more favorable, indicating some relaxation of the quarantine imposed at various points, and jobbers in this city are receiving a renewal of orders for merchandise; but September will not make as favorable a showing in the amount of sales as the corresponding month last year. Railroad traffic is remarkably good, so that, although the season for increased activity has hardly opened, some of the principal lines complain of their inadequate equipment. Wild speculation in wheat has caused much disturbance, but the effects, it is believed, must be temporary. The enormous corn crop, on account of scarcity in Europe, must move forward in full volume, as the failure of the harvest in Germany is attracting attention. Herr Richter, in an article in the *Liberal Zeitung*, calculates that Germany will require 13,000,000 hl. of grain to meet the deficiency. The people, he says, must therefore demand an immediate diminution of the duty on cereal imports. The official report of the crops in France shows that 7,055,161 hectares of land were this year planted with corn, yielding 96,430,062 hl., against 8,967,466 hectares in 1887, yielding 112,456,107 hl. The Washington weather crop bulletin shows conditions favorable for cotton, cane and rice during the past week. The financial outlook is also favorable, both as regards the general market and the Government Treasury. It is a fact worthy of special observation that with the reduction of \$12,000,000 and upward in the public debt during September the aggregate interest-bearing debt for the first time drops below the \$1,000,000,000 limit.

The Stock Exchange market has been active and strong, mainly on the announcement that the Granger roads had come to a harmonious agreement respecting rates, the St. Paul having assented to a restoration of former tariff. London prices were higher, with some buying orders. Reading was heavy on the report of decreased net earnings. On Friday, as on the previous day, the market was in full possession of the bulls. The adjustment of Northwestern rates was considered important, especially for the reason that failure had attended previous efforts to bring the Burlington and Northern and other belligerent roads into line. On Saturday speculation was again buoyant. Southern stocks were bought on reports of low temperature in that section, which indicated the possibility of early frost, the abatement of yellow fever and the consequent resumption of traffic. On Monday the news that the Chesapeake and Ohio would be reorganized without foreclosure started the stocks and bonds of that company upward. Coalers were bought freely. On Tuesday the tone was unsettled by the dearer money and news of the failure of the Traders' Bank of Chicago—an event which proved to have little significance.

United States bonds are quoted as follows:

U. S. 4½, 1891, registered.....	108
U. S. 4½, 1891, coupon.....	108
U. S. 4, 1907, registered.....	129
U. S. 4, 1907, coupon.....	129
U. S. currency 6s.....	121

The wheat market, especially during the latter part of the week, has been much excited by speculation in Chicago, but prices here have been seriously disturbed. The immediate effect was to paralyze the export movement. On Friday one of the oldest firms in the trade was unable to meet its obligations, but in the final settlement there were no serious consequences. With wheat in Chicago advanced to \$2 per bushel for September, spot stock in New York advanced on Monday 3¢ to 3½¢ per bushel compared with Saturday, and speculative trading was on an enormous scale, but there was no cash demand.

On Tuesday wheat again advanced 3¢ over the previous day, and the deal is still going on. Corn also advanced. Cotton was dull. Coffee was quiet at a slight advance in futures. Petroleum was strong, with a fair business for export. Provisions were excited and higher, but declined with the advance in wheat. Sugar is strong, but easier for refined, which is now 1¢ per pound higher than before the trust. The Bay State Refinery, in Boston, shut down by order of the trustees, to check production, and orders were received to shut down the big refineries of Decastro & Donner, in Brooklyn.

The law firm of Shipman-Barlow, Laroque & Choate sent to the Farmers' Loan and Trust Company a certified check for \$112,664.84 in settlement for the moneys which James E. Bedell, their employee, obtained from the trust company by means of bogus mortgages.

The weekly bank statement showed a large increase in surplus reserve, amounting to \$2,813,450. This makes the surplus now held \$14,757,175, against \$9,017,100 at the corresponding time last year and \$5,963,925 in the first week of October, 1886. In loans there was a further contraction of \$690,000; the specie is increased \$4,726,700; the legal tenders are down \$1,311,800, the deposits other than United States are increased \$2,405,800, and the circulation is down \$1,091,300. The improvement is largely due to Treasury operations, its disbursements being far in excess of the interior demand for funds. Money on call is 2 @ 3%. Time loans are quoted at 3% for 60 days, 4% for 90 days, 4½% for 4 months, and 5% for 7 months. Single-named paper sells at 5 @ 6%, and fair indorsed at 5%. The total amount of bonds purchased under the circular of April 17 is \$60,186,900, of which \$41,631,700 are 4's, and \$18,555,200 are 4½'s. Their cost was \$73,340,268, of which \$53,415,353 was paid for the 4's, and \$19,924,915 for the 4½'s. The public debt was reduced \$12,247,026 during September and \$23,709,000 during the last three months. Net cash in the Treasury amounts to \$9,644,845, against \$10,676,320 on September 1. The public money in national banks amounts to \$57,817,385. The receipts for September were \$31,698,174; for three months, \$97,526,253; expenditures, \$80,161,197.

Sterling exchange is quiet, with rates about \$4.84½ for long bills, and \$4.88½ for demand. In London, the condition of the money market is uncertain on account of the possible continued withdrawals of gold for South America, where the speculative fever has broken out anew. The *Economist*, of September 22, says: "Judging from the ease that prevails in the New York money market, there does not seem much likelihood of gold being taken for that quarter this autumn, even though we have to buy more wheat than usual, and have to pay higher prices. Gold will not go in payment of these purchases unless it is needed on the other side, and at present it looks as if no such need will arise." The aggregate clearings of 38 cities for the past week show an increase of nearly 10½%, outside New York the increase was 10½%. New York shows an increase of 10.3%, Boston 13½, Philadelphia 4.6, Chicago 20.7, St. Louis 17.4, Baltimore 27.8, Kansas City 11.3, Omaha 22.1, Minneapolis 7.9, Denver 24.5, Galveston 24.7, Detroit 12, Peoria 33.9, Duluth 21.9, Topeka, 26.7, Cincinnati, decrease, 2.4, New Orleans 14.9, Louisville 5.9, Milwaukee 10.8, St. Paul 2.3, Indianapolis 11.8, Memphis 12.3, Wichita 22.6, Norfolk 26.1.

The official reports from Washington of the foreign commerce of the United States for the month of August show a remarkable change, the imports having fallen off from \$73,430,384 to \$59,929,185. For

eight months of the calendar year the comparison is as follows:

	1886.	1887.	1888.
Total exports.	\$488,789,465	\$459,413,678	\$440,223,691
Total imports.	483,229,769	504,539,992	504,568,814
Excess of im-ports.	.....	\$45,123,314	\$64,345,123
Excess of ex-ports.	.....	\$25,539,696	.....

For the first eight months of 1886 the exports from the United States exceeded the imports over \$25,000,000. For the same months of the current year the balance is reversed and the imports exceed the exports upward of \$64,000,000, making a difference in the balance of trade of about \$90,000,000.

The imports of merchandise at this port during the week were valued at \$8,495,000, of which \$2,792,000 represent dry goods. Since January 1 the total is \$352,141,000, as compared with \$354,124,900 for the same time in 1887 and \$328,021,000 in 1886. The exports were \$7,196,743.

According to the Custom-House report, the exports of specie from this port during the week were \$344,000 and the imports \$85,000. The total since January 1, respectively, is \$28,569,000 and \$6,674,000.

According to the estimates made by *Bradstreet's*, the total number of failures in the United States during the nine months of 1888 is 7330. This indicates on a basis of the record for five years past a total of 10,180 failures for the calendar year 1888. The total number of failures in 1887 was 9740. The increase in assets of failing traders, accompanied by the decrease of about one-seventh of the liabilities, as compared with 1887, constitutes a favorable feature of the exhibit, and an examination of the figures shows that the improvement has been general.

The annual report of the Produce Exchange for 1888-89 shows a net surplus of \$69,232.27, a gain of \$7684.21 over 1887-88. The report of the Gratuity Fund—which was, of course, prepared before Foster's defalcation was discovered—states the surplus or guarantee fund to be \$1,138,573.96.

Coal Market.

Coal is in rather better demand with the approach of cold weather, and a fair business is reported at the advanced prices, but the furor lately experienced is gradually subsiding. At a meeting of the New York Coal agents on Friday, it was determined to make no change for October, and the same was true of the Lehigh Coal Exchange. The companies all report a large business in hand on former orders sufficient to keep them busy for some time ahead. This is true more particularly of orders for the domestic sizes, and for Pea the demand is increasing. To some extent the latter is finding a sale for domestic purposes. Efforts are now chiefly directed to the supply of those points which are liable to be closed by the suspension of navigation and the latter are given a preference. The Western market is absorbing large amounts. Fancy brands are in demand up to the full limit of supply, but the demand for manufacturing sizes is comparatively slow. Inadequate means of transportation continues to cause complaint, interfering with prompt delivery. The Reading company are enlarging their sources of supply in Lykens Valley, also in the Mahanoy region, where a mammoth 50-foot vein lately struck is spoken of as a "bonanza." Tidewater prices are believed to be fully maintained, but it is supposed that the maximum for the season has been reached. Quotations are as follows: Hard White Ash, Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Fine White Ash, Broken, \$3.95; Egg, \$4.30; Stove, \$4.65, Chestnut, \$4.55.

Production for the week ended September 29 is on a scale of magnitude unprecedented for this season of the year, from which it may be inferred that operators are fortifying themselves in anticipation of actual needs. For the week the tonnage is 889,553, against 711,248 for the corresponding week last year, and since January 1 27,591,000, as compared with 25,374,000 for the same time in 1887. The Pennsylvania Railroad transported during the week 223,000 tons of Coal, and since January 1 8,427,000 tons, an increase of nearly 1,000,000 tons compared with last year. Reading's shipments comprised 194,000 tons, of which 32,000 went to Port Richmond and 10,000 to Elizabethport.

Bituminous Coal is in good demand; prices irregular. There is some delay in shipments.

Contracts have just been awarded by the Pennsylvania Railroad Company for the construction of a Coal pier at Harsimus Cove, Jersey City, 1200 feet long by 80 feet wide, on which is a trestle for cars, so that Coal can be dumped directly into vessels.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from September 24 to September 29, and from January 1 to September 29, inclusive, were as follows:

	Sept. 24 to Sept. 29.		Jan. 1 to Sept. 29.	
	Tons.		Tons.	
Pig Iron: Crocker Bros.....	989		9,292	
G. W. Stetson & Co.....	315		12,765	
James Williamson & Co.....	300		4,300	
Henderson Bros.....	220		1,685	
W. H. Walbaum & Co.....	200		400	
E. Foley.....	200		200	
N. S. Bartlett.....	100		4,400	
Jas. Lee & Co.....	50		375	
Spiegel & Co. Naylor & Co.....	1,105		9,124	
Crocker Bros.....	631		4,883	
Dana & Co.....	500		2,903	
Steel: A. Milne & Co.....	17		1,072	
W. F. Wagner.....	10		1,119	
F. S. Pilditch.....	9		350	
M. Cohn & Co.....	9		208	
J. Abbott & Co.....	8		448	
Chas. Hugill.....	8		223½	
Montgomery & Co.....	8		68	
Newton & Shipman.....	4		129	
C. F. Boker.....	3		185½	
Steel Rods: Dana & Co.....	914		4,104	
Naylor & Co.....	450		15,971	
J. A. Roebbing's Sons.....	100		1,359	
Cary & Moen.....	25		733	
R. H. Wolf & Co.....	20		3,011	
American Screw Co.....	10		125	
Steel Crop Ends: Dana & Co.....	100		1,063	
Steel Blooms: G. T. Carter.....	90		90	
Steel Billets: A. Milne & Co.....	288		839	
Steel Sheets: Pierson & Co.....	41		940	
Ogden & Wallace.....	35		172	
A. Milne & Co.....	11		52	
Steel Hoops: Ogden & Wallace.....	5		34	
Steel Tires: Temple & Lockwood.....	4		6½	
Steel Forgings: Thos. Prosser & Son.....	127		3,675½	
Steel Plate Cuttings: Naylor & Co.....	47		96	
Iron: A. Milne & Co.....	150		150	
Naylor & Co.....	19		19	
Iron Beams: R. F. Downing & Co.....	34		825	
Iron Wheels: R. F. Downing & Co.....	10		56	
Iron Girders: R. F. Downing & Co.....	92		501	
Rivet Rods: Bacon & Co.....	50		111	
Sheet Iron: T. B. Coddington & Co.....	30		1,148	
Cotton Ties: Wheelock & B. Bullard & W.....	475		925	
J. S. Leng's Sons.....	75		1,080	
Swedish Bar Iron: C. v. Philip.....	50		885	
	150		278	

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	18,830	416,654
Dickerson, Van Dusen & Co.....	9,279	209,566
Pratt Mfr. Co.....	3,937	136,922
N. L. Cort & Co.....	2,407	81,691
Jas. Byrne & Son.....	2,043	30,565
T. B. Coddington & Co.....	1,836	180,949
A. A. Thomsen & Co.....	1,636	101,085
Merchant & Co.....	852	18,249
R. Crooks & Co.....	836	54,534
G. B. Morewood & Co.....	601	36,790
Bruee & Cook.....	548	79,609
E. S. Wheeler & Co.....	273	5,963
Newell Bros.....	50	50

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	538,379	8,884,204
Naylor & Co.....	280,562	2,472,923
Phelps, Dodge & Co.....	224,185	1,719,285
American Metal Company.....	78,409	1,282,034
R. Crooks & Co.....	55,979	470,431
Hendricks Bros.....	43,196	399,957
Lehman & Sons & Company.....	36,811	65,630
F. Naumann.....	3,000	3,000

	Casks.	Casks.
Antimony: American Metal Company.....	55	260
Phelps, Dodge & Co.....	30	500

Irons and Metals Warehoused from September 24 to September 29, Inclusive:

	Pounds.	Tons.
Lead: Schultz & Ruckgaber.....	228,987	
Iron: A. Milne & Co.....		78

Hardware, Machinery, &c.

Am. Meter Company, Hardware, ca., 25
Bainbridge, H. & Co., Mach'y, ca., 8
Baker, Hermann & Co., Mdse., ca., 5; Hardware, ca., 6; Detonators, ca., 8; Mdse., ca., 9; Arms, ca., 28
Clark Thread Company, Mach'y, ca., 55
Curley, J. & Bro., Mdse., ca., 8
Dunham, Buckley & Co., Hardware, case, 1
Field, Alfred & Co., Mdse., ca., 50
Folsom, H. & D., Arms, ca., 10
Graef Cutlery Company, Cutlery, ca., 4
Hartley & Graham, Guns, ca., 8
Lau, J. H. & Co., Arms, ca., 26
Lewis & Conger, Knife Cleaners, ca., 6
Taylor, Thos., Mdse., ca., 6
Shoverling, A., Arms, ca., 58
Shoverling, Daly & Gales, Arms, ca., 20
Vom Cien & Co., Skates, ca., 5
Wiebusch & Hilger, Lim., Mdse., ca., 10; Hardware, ca., 6
Witte, John G. & Bro., Cutlery, ca., 2
Order: Ironwork for Mexico, pkgs., 154; Hardware, ca., 34; Mach'y, &c., ca., 29.

Exports of Metals.

	Sept. 29. to Sept. 29. Pounds.	Jan. 1. to Sept. 29. Pounds.
Copper: J. Abbott & Co.....	225,000	11,120,619
Lewisohn Bros.....		8,929,022
F. A. Lomal.....		2,581,293
American Metal Company..	56,000	5,405,834
G. H. Nichols.....		223,839
J. Bruce Ismay.....		112,000
S. Mendel.....		560,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Com- pany.....		224,034
J. Kennedy, Tod & Co.....		112,028
H. Becker & Co.....		1,250
Orford C. & S. Rtg. Company		449,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....	146,000	1,277,130
J. Parsons & Co.....		430,000
Naylor & Co.....	112,708	362,709
Bridgeport Copper Com- pany.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,934
Ladenburg, Thalmann & Co.		229,371
W. H. Crossman & Bro.....		4,000
R. Crooks & Co.....		1,000
Copper Matte: Williams & Terhune.....		34,382,598
Lewisohn Bros.....		3,021,610
American Metal Company..	213,029	2,629,102
J. Abbott & Co.....		295,000
C. Ledoux & Co.....		485,800
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		180,995
Kunhardt & Co.....		41,853
Old Copper: Burgess & Co....	24,239	584,813

Metal Market.

Copper.—London has been unsettled and lower, with spot Chili Bars, which gave way from £101 to £96 owing perhaps to the unfavorable statistics, the visible supply on October 1 being 89,154 tons in England and France, against 94,170 on September 1. Futures meanwhile rose from £77 to £79. 10/; good merchantable brands declined from £78. 5/ to £78. Best Selected is cabled £82 this morning. Here the shorts covered on Monday, November and December contracts at 17.70¢ @ 17.75¢; since then the market has become weak and unsettled at 17¢, bid for spot and October, and 17.30¢ November, with offerings at 17.75¢ @ 17.95¢. The closing prices at the Metal Exchange to-day were 17.10¢ bid, 17.90¢ asked. The consumptive demand for Copper is represented as being good, and the lowest at which the syndicate has been willing to sell is, we hear, 17.70¢. The following was telegraphed from Washington:

The Senate Committee on Finance to-day began the inquiry into the operations in this country of the French Copper syndicate. The witnesses examined were Charles H. Pine, of Ansonia, Conn., treasurer of the Parrot Silver and Copper Mining Company, of Montana; Charles Raht, of New York, a Copper broker, and John Stanton, of New York, treasurer of three lake Copper mining companies. It was

explained by all the witnesses that the Société took all the surplus Copper produced in America and sold it abroad, paying the American companies one-half of the sum realized above 13¢ ¢ lb, and making the deficit good when the price realized was less than 13¢, whether sold at home or abroad. The Société had the right at all times to fix the price of sale. The Société had contracts, witnesses understood, with practically all the mines in the country. The Société had not a monopoly of Copper manufacture in France, although it controlled many mills. No Copper had been imported into this country for several years. All the witnesses agreed that but for the protection afforded by the tariff originally neither the mines of Lake Superior, Arizona nor Montana would or could have been developed. The protection afforded by the tariff had made the United States the largest Copper producing country in the world. A few years ago—in 1883 and 1884—the English market controlled the prices of Copper, and English speculators so manipulated the market as to run the price down below the point where American mines could be worked with profit. It was at this juncture that the Société began its operations and it had increased the price of Copper to a paying basis.

The import into Liverpool and South Wales from January 1 to September 17 of American Copper has been 18,991 tons, as compared with 7881 tons same time last year.

Tin.—This metal has been ill sustained in the London market, declining as it did from £103. 17/6 to £101. 15/, spot, and from £102. 17/6 to £101. 15/; total sales, 260 tons. The visible supply is reduced but little, being on October 1 12,451 tons, against 12,740 on September 1 and 11,907 on October 1, 1887. Here the available supply is light, hence the spot figure is sustained at 23.55¢, but in a speculative way the tendency has been downward, the dealings summing up about 100 tons, October selling from 23.10¢ down to 22.85¢, 22.65¢ being bid for November, but 23.10¢ @ 23.25¢ asked. From January 1 to August 16, the latter inclusive, the Straits Settlements shipped to the United States 19,348 piculs of Tin. At the Metal Exchange 10 tons prompt shipment still brought 22.95¢ and 10 tons November the same figure. The closing price to-day was 23.90¢ asked. **Tin Plates.**—The demand has been rather quiet for the past week, partly accounted for by the fruit-packing season being about over. Prices are a shade easier on the spot. The inquiry for futures has fallen off somewhat. The quotation at Liverpool still continues at 14/ for Cokes, but it is being shaded in actual business. We quote at the close, large lines, ¢ box: Siemens-Martin Steel, Charcoal finish, \$5.25 @ \$5.75; Coke finish, \$4.70; Terns, \$4.30 @ \$4.40; Bessemer Cokes, \$4.60 @ \$4.62½, and Wasters, \$4.30.

Lead.—Since our last week's report 1094 tons were sold on the Metal Exchange, October from 5.05¢ to 5.10¢, and even 5.12½¢, closing at 5.10¢, and November at 4.95¢, the market being rather unsettled; still the spot price to-day is 5.12½¢. The closing price at the Metal Exchange to-day is 5.02½¢ bid, 5.10¢ asked. Consumers did little or nothing. There have been rumors of a revival of the Corroders pool, and the thing seems to be in a fair way toward accomplishment. In London, meanwhile, Soft Spanish dropped from £14. 17/8 to £14. 15/, while English Pig is cabled 15/.

Spelter.—The market here has become a little livelier; under 5½¢ no Domestic Spelter can be had; Silesian cannot be laid down here for less than 6¢, as it has improved to £19. 2/6 in London. The Vieille Montagne Company have raised the price for Sheet Zinc 2 francs ¢ 100 kg.

Antimony.—Hallett advanced to £42 in London; we quote the same 10½¢ here and Cookson 12½¢. There is a fair jobbing demand and the market is steady.

New York Metal Exchange.

The following sales are reported:

FRIDAY, September 28.	
200 tons Lead, October.....	5.05¢
SATURDAY, September 29.	
100 tons Lead, spot.....	5.05¢
18 tons Lead, spot.....	5.07½¢
100 tons Lead, October.....	5.12½¢
MONDAY, October 1.	
550 tons Lead, October.....	5.12½¢
80 tons Lead, November.....	4.95¢
35 tons Tin, spot.....	23.40¢
10 tons Tin, November.....	23.10¢
50,000 lbs. Lake Copper, November.....	17.70¢
25,000 lbs. Lake Copper, December.....	17.75¢
TUESDAY, October 2.	
10 tons Tin, October.....	22.95¢
20 tons Tin, October.....	22.80¢
10 tons Tin, October.....	22.90¢
48 tons Lead, October.....	5.10¢
WEDNESDAY, October 3.	
260 tons Lead, October.....	5.05¢
65 tons Lead, October.....	5.02½¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Oct. 3, 1888.

Information comes from a trustworthy source that late negotiations between M. Secrétan as representative of the so-called "syndicate" and the several copper mining companies for an extension of existing contracts have resulted favorably. It is stated, in fact, that contracts with the leading companies will be closed within the next ten days for their entire production for a period of nine years at £72 per ton. A certain amount of the profits over and above that price will be shared with the various companies, according to the proportion of their output. The production will be restricted, but as yet particulars do not come to the surface on this important point. The announcement is reflected in a hardening tendency to the market for Chili Bar futures, and of prices for outside brands, the latter showing 25/ rise, with the tendency still upward. Furnace material is also higher and in active demand, mainly from smelters. James Lewis & Son report sales of 2000 tons Anaconda Matte at 15/3 ¢ unit and 500 ditto at 15/4½ ¢ unit. Sellers now ask 15/6, an advance of 6d the past few weeks. The business in spot Chili Bars the past week has been confined mainly to closing out old contracts, and, as purchases to cover short sales were smaller than they have been heretofore, prices show some decline.

The Block-Tin market has received a very fair measure of support during the week from purchases reported to be for American account. From other sources the demand has been moderate. American orders have dropped off somewhat the past few days, however, and prices have weakened a little in consequence and there has been limited trading. There is no material change in the market from the statistical standpoint.

In the Tin Plate market the situation is practically the same as it was a week ago. There is considerable inquiry, but buyers and sellers are wide apart on prices in negotiations involving large lots, and transactions are therefore of moderate volume.

Prices for Pig-Iron "warrants" generally have averaged somewhat lower, consequent upon more or less disposition to realize profits and more aggressive methods pursued by "bear" operators. The home demand for consumption continues active, however, as does also

he export trade, and this, coupled with the lively trade in Finished Iron and Steel, acts as an offset to "bear" operations in the "warrant" market. However, maker's brands of Scotch are 6d. to 1/6 off, and Hematites have sold from second hands at 1/6 decline. Spiegeleisen is a shade higher and very firm. Steel Rails have dropped over 5/ under sharp competition; but Billets and Slabs, on the other hand, are held at a slight advance.

There has been a livelier demand for Old Iron Rails, and bids are reported that come very near to holders' figures. The drift of the American market is watched with considerable interest. The endurance of the strength reported there and the outcome of the present demand will be largely instrumental in shaping this market. At the present time £3. 2/6 for Flanges and £3. 5/ for Double-Heads, f.o.b., are apparently sellers' lowest figures.

Scotch Pig.—Business fairly active, but prices affected by the decline on warrants.

No. 1 Coltness, f.o.b. Glasgow	50/6
No. 1 Summerlee, " "	52/
No. 1 Gartsherrie, " "	46/6
No. 1 Langloan, " "	49/6
No. 1 Carnbroe, " "	43/6
No. 1 Shotts, " at Leith	48/6
No. 1 Glengarnock, " Ardrossan	46/6
No. 1 Dalmeilington, " "	43/
No. 1 Eglinton, " "	42/
Steamer freights, Glasgow to New York, 10/ Liverpool to New York, 10/.	

Cleveland Pig.—The demand has slackened somewhat and prices are not so firm. No. 1 Middlesboro', G.M.B., 37/; No. 3 do., 34/6.

Bessemer Pig.—Prices have weakened under pressure to sell at second hands. Business liberal at the decline. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen.—Offerings are moderate, and higher prices are asked. English 20% quoted 78/6, f.o.b. N. W. England shipping point.

Steel Rails.—There has been a fair business at somewhat lower prices. Standard sections quoted at £3. 16/3 @ £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—The market fairly active, and prices very firm. We quote £4 @ £4. 1/3 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Demand continues brisk and prices are firm. Bessemer, 2½ x 2½ inch, £4. 1/3, @ £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Business moderate and prices unchanged. Mild Steel No. 6 quoted at £5. 18/6 and No. 5 at £5. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Very little demand, but offerings moderate and prices firm. Bessemer, £4 @ £4. 1/3, f.o.b. at N. W. England shipping point.

Old Rails.—Transactions moderate, but holders very firm. Tees held at £3. 2/6, and Double Heads £3. 5/, f.o.b.

Scrap Iron.—Demand very slow and prices weaker. Heavy Wrought quoted at £2. 5/, f.o.b.

Crop Ends.—The market quiet, but very steady. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Manufactured Iron.—There is still a good business, and prices remain very firm. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d.	£ s. d.
" Common	@ 7 12 6	@ 5 2 6

Staff. Bl'k Sheet, singles	@ 5 2 0
Welsh Bars (f.o.b. Wales)	@ 4 17 6

Tin Plate.—Demand is quite active, and moderate sales have been made at higher prices. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/6 @ 16/
IC Bessemer steel, Coke finish	14/3 @ 14/6
IC Siemens	14/6 @ 14/9
IC Coke, B. V. grade	14/ @ 14/3
Charcoal Terne, Dean grade	12/6 @ 13/

Tin.—Very little change is apparent in the situation. Straits quoted at £101. 15/ @ £102, spot, and £102 for three months' futures.

Copper.—Future Chili Bars and Best Selected very firm, with fairly good demand. Chili Bars, £96 @ £98, spot, and £79. 10/ three months' futures. Best Selected, £81. 10/.

Lead.—The market has continued strong, with demand good. Soft Spanish, £14. 17/6 @ £15.

Spelter.—The market firm and fairly active. Silesian, ordinary, £18. 17/6 @ £19.

Foreign Markets.

EQUIVALENTS

	Cents.
Franc, Proesta or Lira	10.3
Florin (Netherlands)	40.2
Florin (Austria)	35.9
Millre (Portugal)	1.08
Millre (Brazil)	54.6
Mark (Germany)	23.8
Allogram	2.205
Picul	134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, August 31, 1888.—**Asphaltum.**—Our market has been moderately active and steady at \$14.4 per ton for Boiled and \$6.84 for Crude, f.o.b., export duty included. Shipments during the first eight months amounted to 37,891 tons, against 29,578 tons last year, and 22,614 tons in 1886. *Exchange*, 90 days' sight on London \$4.86 @ \$4.88.—*E. P. Masson.*

CHILI.

VALPARAISO, August 3, 1888.—**Copper.**—Although cable advices from England have been favorable enough, the volume of dealings has remained restricted for the lack of copper offering for sale, nearly all that can be shipped before the end of next month being disposed of. Sales figure up 10,742 quintals all told at \$29.45 @ \$30; the price of \$29.85 equals £75. 5/6, with 26/6 steam freight. *Nitrate.*—There has been a revival in the demand, but not much has transpired in the way of sales, because of the extreme stiffness exhibited by holders. Sales aggregate for the fortnight 220,000 quintals at \$2.70 @ \$2.80; the price of \$2.75 for 95% equals 8/4½, with 27/6 freight and 26½ d. exchange. Futures, September to November, are worth \$2.72½ @ \$2.77½. July shipments to Europe have been 37,000 tons, and to the United States 2500; loading 1st inst., 85,000 and 6000 tons respectively, chartered in July for Europe 39,800 tons, and for the United States 3200. *Coal.*—Continues drooping, Newcastle being offered at 40/ and June shipments having been paid 35/. *Exchange*, 90 days' bank, 26½ d.—*Weber & Co*

EAST INDIES.

SINGAPORE, August 8, 1888.—Our last report was dated 25th ult. **Tin.**—The sales have amounted to 300 tons, and supplies are coming in more freely; we close with buyers at \$35 and sellers at \$35.25. Shipments this month will probably exceed 1500 tons. *Gum Copal.*—There is hardly any demand and stocks are large. *Gum Damar.*—No transactions. *Tonnage.*—London rates are steady at 25/ @ 30/ for weight and 36/6 @ 40/ for light stuff. New York via canal, there is no tonnage offering. Via cape, the Tabique and Maccabeo are loading and the Sonntag has been fixed to arrive at 25/ for weight and 30/ for light stuff. *Exchange* is steady at 3/1½ for six months' sight credits. Total Tin shipments from the Straits Settlements to the United States during the first seven months have been as follows: 16,520 piculs, against 46,858 in 1887, 40,706 in 1886, 16,471 in 1885, 37,408 in 1884 and 67,119 in 1883.—*Gillfillan, Wood & Co.*

PENANG, August 17, 1888.—**Tin.**—The market opened a fortnight ago at \$34.15 per picul in order to improve to \$37.10 subsequently, and finally wound up at \$35.90. Receipts for the two weeks have been 10,000 piculs, of which

Europeans took 3700 and Chinese 6300. *Exchange*, 4 months' bank, 3/1.—*Schmidt, Kustermann & Co.*

MANILA, September 24, 1888.—**Hemp.**—There are buyers at \$9.87½ per picul, against \$10.50 same time last year, the former figure equaling per ton, cost and freight, £32. 17/6, and the latter £37 5/. There have cleared for the United States since last cable 12,000 bales, against 4000, and since January 1st, 137,000, against 154,000. There are still loading for the same destination 36,000 bales, against 55,000. The clearances for Great Britain since January 1st have been 252,000 bales, against 157,000 last year, and there remain loading 13,000, against none. There were cleared for all other ports 55,000, against 30,000, whereas receipts from all ports since last cable amounted to 18,000, against 13,000 bales, and since January 1st they have been 457,000 bales, against 367,000 last year, and 294,000 in 1886. *Freight*, \$6, against \$5.50 in 1887. *Exchange*, six months' sight, 3/5½, against 3/8½ last year.—*Ker & Co. to Charles Nordhaus, 89 Water street, New York, per cable direct.*

BOMBAY, August 15, 1888.—**Petroleum.**—There have been sold in this market during the fiscal year from June 1st, 1887, to June 1st, 1888, 870,000 boxes of refined Petroleum of 10 gallons each; 320,000 came from America, and 550,000 from Russia, both 125° Government test, each box containing two tins of 5 gallons each. The American oil brought on an average 3.70 rupees per box; the Russian, 3.50, there being but a slight difference in the quality. Russian has been well introduced, is popular, and seems to have a good future before it. Sunflake American of 150° can be placed to a moderate extent at a higher figure, but the bulk of consumption runs on American and Russian of 125°.—*Times of India.*

GERMANY.

HAMBURG, September 22, 1888.—**Pig Iron.**—There has not been much of a change except so far as Spiegel is concerned, for which at a reduction in price to 53 marks for 10 to 12% large American orders have been filled. The remaining sorts have been neglected, with the exception of Thomas. The general demand for Forged Pig is rather slack. Luxembourg has nevertheless remained steady; Finished Iron has been slightly looking up lately, the domestic inquiry increasing a little, and to some extent it is also moving off more readily for export. Orders received are all to the close of the year. The lowest figure for Rod Iron at a recent adjudication at Cologne was 115 marks, and the highest 128. Beams are selling as largely as ever; Hoop Iron has undergone no change. Without exception the works turning out boiler plates are as fully engaged as ever at firm prices; thin sheets still lag behind. The Wire branch reports no particular change except that there is for the time being less fear of the syndicate dissolving. A continued good trade is reported by foundries, machine shops and car works. The latest adjudication of Steel Rails that came off in Baden showed the lowest figure to be 120.50 marks per ton delivered at Mannheim. We quote at the close Bessemer Steel Billets 135 marks and Steel Rail for mines 115. During the first nine months the export of Finished Iron from Germany has been only 101,940 tons as compared with 199,902 same time last year, and of Hardware, &c., 482,277, against 541,469—together 582,217, against 941,391 last year. The import was as follows: Finished Iron this year 116,320, against 82,258 last year, and of Hardware 20,020, against 28,358—together 142,340, against 112,616. *Metals.*—Lead continues rising, and Copper and Spelter are both firm. International Lead Syndicate negotiations proceed successfully; Mechernich and the Commern Union will be largely benefited should the matter be clinched.—*Borsenhalle.*

Alex. Laughlin & Co., engineers and contractors, of Cleveland, Ohio, report, under date of October 1, that they have contracted with the Ohio Iron Company, Zanesville, Ohio, to erect, equip and place in operation at their works one regenerative gas furnace, with working hearth 7 x 18 feet, together with the artificial gas producers necessary to operate the same. They have also closed contract with the Lake Erie Iron Company, of Cleveland, Ohio, to erect a furnace, with working hearth 7 x 14 feet, for heating iron for their 9-inch train; and have just completed two furnaces for the Knoxville Iron Company, Knoxville, Tenn., and two for the Belfont Iron Works Company, Ironton, Ohio, which are working in a very satisfactory manner.

Hardware.

During the past week there have been comparatively few changes in price, and the volume of business about as at our last report. Orders are coming in freely and indicate a good condition of general business. Manufacturers in some lines are behind their orders and seasonable goods especially are in excellent demand.

Cut Nails.

The New York market has not improved so far as prices for Iron Nails are concerned, low sellers cropping up periodically. In Steel Nails the situation is somewhat different. For some time, until lately, any differences in price between the two materials had practically disappeared. Now they are again being insisted upon by some manufacturers of Steel Nails declining to meet the low prices on Iron Nails. We quote \$1.85 @ \$1.90 for carload lots of Iron Nails.

Barb Wire.

The New York Barb-Wire market continues steady, with about the same conditions as were alluded to in last week's report. The present price in New York for carload lots may be quoted as 3.6 cents for four point Galvanized, small lots being sold at 3.8 to 3.87½ cents. Manufacturers are evincing a conservative disposition in regard to booking orders for future delivery.

Miscellaneous Prices.

The price of goods in which Copper enters largely remains generally without change, it not being found feasible to advance the quotations in accordance with the advance in the raw material. Some manufacturers also have had large stocks of Copper, which have enabled them to produce the goods without the increased expense of the metal at prices now ruling. Referring to this feature of the market a well-known manufacturer writes:

We have found the same demand for our goods this year as we did last. The Presidential election does not seem to affect our trade. The only serious trouble this year is the advance in the price of Copper which has been brought about by the Copper syndicate. With the competition we have it is impossible to get the advanced price for our goods to correspond with the advance in Copper. It is not very pleasant to know that the great industries of our country are held down by the throat by a few French-Jew bankers in France, who have control of the metal that is of so much importance to the interests of our country.

The Grand Crossing Tack Company, Grand Crossing, Ill., have issued what they designate as a net price list, which is of interest, especially as it indicates their method of putting up Tacks. In this pamphlet the regular Tack list is dispensed with and net prices are named on the goods, which also in some lines are put up in new ways. For example, the first page of the list is occupied with prices on Copper Plated, Tinned, Silver Steel and Blued Steel Carpet Tacks, prices being given on the Tacks with 75, 100, 150, 200 and 250 Tacks in a paper. As illustrating their method, we reproduce below their quotations on

Blued Steel Carpet Tacks.

75 Tacks in a paper.	100 Tacks in a paper.	150 Tacks in a paper.	200 Tacks in a paper.	250 Tacks in a paper.
oz. per doz.	per doz.	per doz.	per doz.	per doz.
6.....\$0.08½	\$0.07	\$0.13	\$0.13½	\$0.16½
8......07½	.08	.14½	.15	.18½
10......08½	.09½	.16½	.17½	.21½
12......09½	.10½	.19	.20½	.24½
14......10½	.12½	.21½	.23	.27
16......12	.13½	.24	.26	.29½

The company also explain their method of putting up Carpet Tacks in cases containing a wide variety of assortments, both as to the number of Tacks in a pasteboard

box and the number and assortment of boxes in a case. For example, the cases contain 100, half gross or one gross, of boxes, which in turn contain, as above, 75, 100, 150, 200 and 250 Tacks, either Silver Steel, Tinned Steel, Copper Plated or Blued Steel. As illustrating this method of putting up the goods, and the assortments, we give below the prices of cases containing 100 papers with 100 Tacks in each:

	Silver Steel.	Per Case.
[1001]	6 8 10 oz.	
	30 40 50 bxs.....	\$0.71
[1002]	6 8 10 oz.	
	20 50 30 bxs.....	.72
[1003]	8 10 oz.	
	60 40 bxs.....	.75
[1004]	8 10 12 oz.	
	30 40 30 bxs.....	.81
[1005]	8 10 oz.	
	50 50 bxs.....	.76
[1006]	6 8 10 12 oz.	
	15 40 30 15 bxs.....	.75

Blued Steel.
Same Price as Silver Steel.
Tinned Steel.

		Per Case.
[1101]	6 8 10 oz.	
	30 40 30 bxs.....	\$0.83
[1102]	6 8 10 oz.	
	20 50 30 bxs.....	.84
[1103]	8 10 oz.	
	60 40 bxs.....	.87
[1104]	8 10 12 oz.	
	30 40 30 bxs.....	.94
[1105]	8 10 oz.	
	50 50 bxs.....	.89
[1106]	6 8 10 12 oz.	
	15 40 30 15 bxs.....	.87

Assorted Cut Tacks and other goods are put up similarly. Prices are also given on the other goods in the varied line made by the company.

Chas. A. Bowen & Co., Sterling, Ohio, issue a circular relating to Taft's Vise Wrench, in which they illustrate its special features and allude to its advantages. It is quoted at a discount of 50 and 10 per cent. from the regular list.

Sterling Wrench Company, Sterling, Ohio, alluding to their additions to their manufacturing facilities, make the following quotations on Wrenches of their manufacture:

	Discount.
No. 1, Machinists'.....	70&10
No. 2, Agricultural.....	80&5

A slight decline has taken place in both Manila and Sisal Rope, the prices of which have fallen off ¼ to ½ cent per pound. This is owing to competition between the different markets, and the price is regarded now as more settled.

The prices agreed upon by the manufacturers of Sheet Copper, &c., have for some time been well maintained, but there are indications of slight concessions, as some new competition is entering the market.

An advance has been made in the price of Emery Wheels, by which the general discount on 1 inch and larger has been fixed at 55 per cent, and on smaller than 1 inch at 45 per cent., subject to a discount of 2 per cent. for cash.

The price of the Standard Apple Parer, made by the Henry C. Hart Mfg. Company, Detroit, Mich., is \$9 per dozen, with a discount of 50 and 10 per cent.

In the Ammunition market the irregularities to which we have heretofore referred continue without abatement and with some increase. A large business is being done by the manufacturers and dealers at regular prices, but goods continue to be offered by houses who are not in contract with the association at cut prices, and it appears that such houses are enabled to procure the goods required for their trade with less difficulty than earlier in the season. The extent to which such irregularities are carried is regarded by many as indi-

cating an indisposition on the part of the association to prevent them, growing probably out of a conviction on their part that it would not be feasible to do so. The present system, which has for a long time served a good purpose in securing a general maintenance of prices, has apparently ceased to meet the existing conditions, and it would not be surprising if some new arrangement were found necessary to accomplish the desired results.

Obituary.

In the recent death of Augustus Stanley, New Britain, Conn., another veteran manufacturer has been removed from that busy city. His connection with the manufacture of Rules commenced in 1854 as senior partner of the firm of A. Santley & Co. In 1857 the business of this firm was consolidated with others in the organization of the Stanley Rule and Level Company. Mr. Stanley has been one of the directors of the company since its incorporation, and, until recently, was actively identified with its manufacturing interests. His loss is sincerely mourned in the community where he spent his whole life and was best known.

Charles B. Tatham, who died on Thursday, September 6, at his residence, 276 De Kalb avenue, Brooklyn, was born at Elwood, near Philadelphia, in 1811. In 1838 he came to this city, and together with Benjamin Tatham, a brother, established the house of Tatham Brothers, engaging in the manufacture of lead. This house carried on the business in conjunction with a Philadelphia house, conducted by the three brothers, Henry B., William P., and George N. Tatham. Some years ago the house moved from Water street to its present place, 82 Beekman street. Mr. Tatham was ill about a week, dying at the age of 77. He leaves a widow and one son.

The death of N. Murphy, of the firm of N. Murphy & Son, Erie, Pa., is announced. Hereafter the business will be carried on by H. H. Murphy and Fred. Murphy under the firm name of Murphy Bros.

Trade.

From our Louisville correspondent we have, under date September 29, the following advices in regard to that market:

For the past week the Hardware trade of Louisville, Ky., has been quite up to promise, and the last few days were brightened by a few orders coming voluntarily from the section of the South afflicted with yellow fever. Business has undoubtedly been seriously affected by the scare, but is satisfactorily righting itself into a more natural state.

Consumers and country merchants in the infected districts are beginning to realize that they will need quite as much, or even more goods than usual, on account of the abundant crops, which in turn give heavy tonnage to the railroads, and when they prosper Iron, the index to trade, receives an impetus that benefits all lines. Bar Iron is held firmly by the mills, giving the dealers opportunities to advance on their late low prices, and sells readily at \$1.75 from store for common. Some mills are feeling the market for another advance. The dealers, though, deprecate such action, and would prefer to see prices remain steady. Sheet Iron is scarce from the mills; those usually supplying this market are not able to take any new orders, and are very backward in filling the ones already booked.

Cut Nails are also firm, dealers' large stocks going off readily. Jobbers should get more for them than they do, this stock being used by many as simply a leader to sell other goods. Wire Nails are in fair demand from store. Very few mills show any desire to take orders at less than price adopted at last meeting of the association.

Barbed Wire is quiet, but firm. The mills being satisfactorily fixed on contracts, and raw material higher, there are no inducements to shade prices. The jobbers' trade is fair, Wire selling from store at full figures.

Items.

It will be seen in the special announcement on page 82, that the Palmer Hardware Mfg. Co., Troy, N. Y., have discon-

tinued infringement suits against the Empire Portable Forge Company, Cohoes, N. Y., to whom a license has been granted for the manufacture of the goods in question.

The Gibbs Lawn Rake Company, of Canton, Ohio, will hereafter be represented in Chicago by J. E. Davis & Co., 115 Dearborn street, in place of Hiram Sibley & Co. A speciality of the company to which they call particular attention is the Gibbs Post-hole Digger, which they refer to as meeting with much favor and increasing sales.

Hibbard, Spencer, Bartlett & Co., of Chicago, are building up a large trade in Lamps, the assortment they offer enabling them to supply a complete line for every use. Their orders recently received cover almost every part of the West, extending up into British Columbia.

It is reported that the Russians are complaining of the falsification of trade-marks and imitation of foreign manufactures by the Germans. According to a paper read before the Pan Slavist Society for the Promotion of Industry and Trade, Germany is said to be filling the Russian markets with her home-made English, French, Belgian, and American manufactures. And these goods, notwithstanding their inferior quality, find ready purchasers. According to M. Pobudoff, the reader of the paper, real English Plows and American Sewing Machines are all but unknown in Russia, the German imitations supplying their places.

The Calumet Iron and Steel Company, Chicago, Ill., whose Parallel Sided Chisel Pointed Steel Nail was illustrated in our last issue, call the attention of the trade to the merits possessed by it and the advantage with which it may be handled by the Hardware trade. They state that with the view of introducing these Nails they will send sample lots of five kegs or more, and, on receipt of specifications, will quote bottom prices. The manner in which they call attention to it is shown in their advertisement.

The Rogers & Hamilton Company, Waterbury, Conn., issue a circular relating to the Rogers & Hamilton Combination Set, No. 32. The Knives are described as made from crucible steel plated 14 dwts., and after plating hand burnished, making them especially durable. The Forks are made from nicked silver, and are plated by their sectional plating process, which is illustrated in their advertisement on page 102.

The Samuel Winslow Skate Mfg. Company, Worcester, Mass., issue a neat catalogue of Ice Skates for the season 1888-89. It represents a varied line, of which illustrations are given, with list prices. Extra parts are also represented, with price list.

The Merriam Mfg. Company, Durham, Conn., announce that they have purchased the Mosler Index Combination Lock and that the Yale Lock Mfg. Company have improved the same by substituting a revolving dial for the pointer heretofore used thereon. It will hereafter be known as the Yale Dial Lock, and its exclusive use, as applied to tin boxes, is retained by the Merriam Mfg. Company, the Yale & Towne Mfg. Company having modifications of this Lock adapted for use on drawers, desks, tills, &c. The internal parts of the Lock are referred to as remaining unchanged and the advantages of the new revolving dial pointed out.

The excellent illustration of Stanley's Roofing Brackets, on the inside page of our cover, will show how these articles can be utilized for campaign purposes—sitting out on the roof to see the procession, &c.—but they will interest mechanics more

for their permanent uses in providing a secure and rapid means of placing stagings, for shingling or painting roofs.

Merrie, Verhage & Co., 11 West Seventh street, Cincinnati, Ohio, favor us with their handsome illustrated catalogue and price list of Plumbing, Steam and Gas Goods. The catalogue is a substantial and well-gotten up cloth-bound book some 11 x 7 inches in size, and contains over 300 pages. Running over it, we notice that the first 80 pages are filled with illustrations, general and sectional, of an extensive variety of Stops, Cocks and Bibs. The engravings are well executed, and accompanying the illustrations are lists giving prices of the different sizes. Miscellaneous Fittings, Couplings, Ferrules, &c., are next taken up, after which considerable space is devoted to Bathtubs, Range Boilers, Sinks, Washtubs, Urinals, Washstands, Water-Closets and Supply-Cisterns. A number of pages are devoted to Lift and Force Pumps, with their various attachments, and lists are given of a variety of sizes of Steam Radiators, the Eclipse Radiator occupying a prominent part. Some 50 pages are filled with illustrations and list of Iron Fittings, followed by an extensive variety of Valves, including several Steam Goods Specialties. The volume closes with Plumbers' Furnaces, Gas Pliers, Pipe-Cutters, Vises and other steam-fitters' tools. Reference to the contents of the volume is facilitated by a complete alphabetical index in the front of the book. The catalogue, which has just been issued from the press, is found of great service to plumbers, steam fitters and all who are interested in similar work.

Trade-Mark Decision.

The following extract is from the decision of Judge Holmes granting an injunction against the Le Page Glue and Cement Company, to which reference was made in our last issue. An injunction was ordered:

Restraining the defendant from the use of the words "Le Page's Glue" or "W. N. Le Page's Glue" on parcels or bottles or cans of Liquid Glue, or from using the name of the defendant corporation on parcels or bottles or cans of Liquid Glue, or from advertising in the name of the defendant corporation as manufacturing or selling Liquid Glue (but without prejudice to the right of said corporation to buy or sell Liquid Glue or make out bills therefor in its own name) or from in any manner representing, or causing or procuring to be represented, that the defendant corporation has been or is carrying on the business formerly carried on by Rueben Brooks and W. N. Le Page as copartners, or by the Russia Cement Company, or is the successor in business of either the said copartnership or the said company, or that the goods manufactured by the defendant company are the goods of the said Brooks and Le Page copartners, or of the Russia Cement Company, without prejudice to the right of the defendant to use certain new labels of which samples have been exhibited to the court and counsel for the complainant and are to be filed in the case.

The new labels state the fact that the Le Page Company are the manufacturers of the Glue to which the labels are applied, but do not designate it as Le Page's Glue, that being the name by which the Russia Cement Company's article has been known and to which the Court decides they have the exclusive right.

Exports.

We give below abstracts from recent manifests showing the exports in Hardware and related lines which have recently been made to Australia and South Africa:

PER BARK GEFION, SEPTEMBER 21, FOR PORT ELIZABETH, AFRICA.

By W. H. Crossman & Bro.—40 dozen Handles, 1 case Hardware, 1800 pounds Sash Weights, 52 pounds Cord, 90 dozen Axes, 158 dozen Hatchets, 12 dozen Hammers, 30 dozen Shovels, 5½ dozen Sledges, 4 dozen Picks, 3 dozen Meat Cutters, 25 Scales, 2 packages

Pumps, 119 cases Plow parts, 102 dozen Hatchets, 5783 pounds Sisal Rope.

By Strong & Trowbridge.—1500 Handles, 30 cases Clothes Pins.

By H. W. Peabody & Co.—20 cases Agricultural Implements.

By Knauth, Nachod & Kuhne.—3 cases Plow Castings, 50 pairs Plow Handles.

By Corner Bros. & Co.—8 dozen Tools, 22 cases Agricultural Implements.

By Coombs, Crosby & Eddy.—16 Plows, 6 Corn Shellers.

By J. Norton & Sons.—3600 pairs Staves, 1 Carriage, 12 dozen Slates, 124½ dozen Cocks, 5 cases Castings.

By Arkell & Douglas.—88 pounds Sash Cord, 1500 pounds Agricultural Implements, 66 pounds Sash Cord, 4 dozen Lifts, 100 pounds Sash Cord, 35 pounds Sash Cord, 2½ dozen Blocks, 16 Picks, 4 dozen Axes, 1 dozen Pulleys, 30 dozen Brooms, 600 feet Hose, ½ gross Fruit Jars, 3 dozen Scales, 20 Pumps, 32 dozen Handles, 9 dozen Lampware, ½ dozen Oil Stoves, 1 dozen Traps, 1 Lawn Mower, 1 dozen Traps, ½ dozen Bows, 8 Agricultural Implements, 6 dozen Saws, 4000 Cartridges, 167 pounds Hardware, ½ dozen Barrows, 6 gross Screw Nails, 2 dozen Locks, 5 pounds Oil Stoves, 3½ dozen Lampware, 2 dozen Traps, 128 pounds Sandpaper, 1½ gross Fruit Jars, 1 dozen Faucets, 1½ dozen Saws, ½ dozen Meat Choppers, 8 dozen Picks, 1½ dozen Braces, ½ dozen Sausage Stuffers, 40 Agricultural Implements, 1-6 dozen Pumps, 25 dozen Brooms, 1 dozen Perambulators, 20 dozen Shovels, 20 dozen Axes, 1½ dozen Sausage Stuffers, 2755 pounds Agricultural Implements, 1-6 dozen Pumps, 60 dozen Axes, 2 dozen Wagons, 24 dozen Washboards, 24 dozen Axes, 16 dozen Hatchets, 80 kegs Nails, 60 dozen Handles, 10 dozen Picks, 16 dozen Racks, 200 Agricultural Implements, 14 cases Sash Weights.

PER BARK SULITELMA, SEPTEMBER 15, FOR SYDNEY, N. S. W.

By Arnold, Cheney & Co.—6 crates Washboards, 3 cases Axes, 1 case Hoes, 2 cases Wagons, 5 cases Hardware, 1 case Wheels, 4 cases Wheels, 103 cases handles, 1 case Wicks, 18 cases Carriageware, 3 cases Shovels, 3574 pounds Paint, 7 cases Wagons, 2 cases Brooms, 4 cases Axes, 29,000 pieces Roofing Slate, 12 cases Varnish, 6 cases Wheels, 4 cases Polish, 3 cases Saddlery, 1 Barrel Bells, 1 case Saddlery, 2 cases Blacking, 1 box Hardware, 4 Boxes Horse-Shoe Nails, 4 cases Brooms.

By Hsley, Doubleday & Co.—15 gross Axle Grease, 6720 pounds Axle Grease, 10 gross Glass Cutters, 1½ gross Metal Toys, 20½ dozen Horse Brushes, 15 gross Axle Grease, 264 pounds Paints.

By R. W. Forbes & Son.—98 sets Harness, 24 cases Wagons, complete, 23 packages Hardware, 4 cases Plated Ware, 2 cases Letter Files, 15 Scales, 3 dozen Scales, 4 cases Agricultural implements, 1 dozen Oil Gates, 6 Horse Hoes, complete, 4 cases Fire Arms, 16 packages Agricultural implements, 49 cases Sewing Machines, 1 dozen Forks, 6 crates Machinery, 65,900 pieces Roofing Slate, 7 casks Glue.

By F. B. Wheeler & Co.—50 gross Wicks, 3 Organs, 66 sets Harness, 2 cases Hardware, 6 crates Woodware, 21 packages Stoves and Parts, 2 packages Plated Ware, 13 cases Clocks, 1 case Clocks, 26 dozen Whips, 84 dozen Handles, 100 boxes Clothes Pins.

By R. W. Cameron & Co.—200 pounds Brushes, 574 pieces Hardware, 40 crates Blacking, 1 case Machinery, 26 boxes Steel.

By Coombs, Crosby & Eddy.—49 dozen Saws, 6 dozen Lemon Squeezers, 3 dozen Wringers, 3 gross Woodware, 63 Pails, 1350 pounds Slate, 1 gross Graters, 24 dozen House-Furnishing Goods.

By Strong & Trowbridge.—5 cases Hardware, 1 case Forks, 1 case Miter Boxes, 4 cases Picks and Axes, 1 case Hammers, 1 case planes, 20 gross Guns, Tools and Cartridges, 1 box Hardware, 3 packages Corn Shellers.

By H. W. Peabody & Co.—5105 pounds Wire Rope, 10,039 pounds Fence Wire, 1 case Machinery, 47 Sewing Machines.

By Mosbacher & Co.—1100 pounds Shears.

By A. Field & Co.—2 gross Shade Rollers, 42 Stoves.

By Winchester Repeating Arms Company.—10 Guns, 40 sets Tools, 100,000 Primers, 3000 Shells, 84,000 Cartridges.

By W. R. Freeman.—1290 pounds Files and Saws, 4852 pounds Axes, 16 cases Axes.

By A. S. Lascelles & Co.—8 gross Mouse Traps, 2 gross Hardware, ½ dozen Brooms, 30 dozen Axes.

By Healy & Earl.—1 case Saws, 1 case Hardware, 3 cases Saw Mills, 1 case Planing Machines, 7 cases Woodworking Machinery.

By P. D. Ackerman & Bro.—300 pounds Plated Ware.

By Peters & Calhoun Company.—4 cases Saddlery.

By H. A. Rogers.—3 boxes Woodworking Machinery.
 By J. A. Ten Eyck.—6 cases Wagon Springs.
 By Rogers, Smith & Co.—7 packages Plated Ware.
 By Meriden Britannia Company.—5 packages Plated Ware.
 By Ansonia Clock Company.—43 boxes Clocks.
 By E. N. Welch Mfg. Company.—45 boxes Clocks.
 By Barber & Co.—2220 pounds Castings.
 By J. Mathews.—250 pounds Nails, 808 pounds Hoop Iron.
 By Crane & McMahon.—8 packages Carriage Ware.
 By Reed & Barton.—26 packages Plated Ware.
 By V. Basanta.—60 dozen Handles, 21 dozen Hoes, 33 dozen Axes, 24 Corn Shellers, 48 Stepladders, 24 Lawn Mowers, 200 Lamp Goods, 42 Velocipedes, 5 dozen Clocks, 700 dozen Handles, 80 Velocipedes, 5½ gross Fruit Jars.
 By McLean Bros. & Rigg.—54 dozen Handles, 2 gross Vegetable Presses, 12 dozen Hammers, 3 dozen Roasters, 3 Churns, 41 Pistols, 30 dozen Rat Traps, 12 dozen Handles, 1 case Hardware, 4½ dozen Hammers, 81 dozen Wire Goods, 3 Rope Reels, 139 dozen Granite Ware, 6 dozen Saws, 1 dozen Fluters, 102 dozen Chimneys, 33 dozen Padlocks, 23 dozen Cow Bells, 4 cases Sporting Goods, 1½ dozen Well Wheels, 6 crates Bats, 50 dozen Illuminators, 123 dozen Hardware, 400 dozen Handles, 4½ dozen Braces, 18 sets Wheels.
 By Arkell & Douglas.—2 dozen Jacks, 141 Axes, 5 dozen sets Axes, 13 dozen Horse Collars, 2 dozen Bench Screws, 17 dozen Hammers, 4 dozen Saws, 975 pounds Hardware, 3 dozen Lanterns, 30 dozen Guns, 45,000 Cartridges, 52 dozen Hatchets, 30 dozen Axes, 8 dozen Picks, 3 dozen Braces, 12 gross Whips, 40 dozen Shovels, 3 dozen Traps, 40 dozen Hammers, 2168 pounds Locks, 5 dozen Axes, 10 dozen Picks, 3 dozen Wrenches, 4 dozen Sad Irons, 254 dozen Handles, 2 dozen Braces, 12 dozen Shovels, 6 dozen Ranges, 4 dozen Stencils, ½ dozen Lawn Mowers, 17 dozen Latches, 22 dozen Wrenches, 315 dozen Lampware, 12 gross Chisel Handles, 71 sets Double Trees, 11 cases Carriage Ware.
 By W. H. Crossman & Bro.—24 dozen Axes, 20 dozen Hatchets, 1 barrel Carpenters' Tools, 3 gross Shade Rollers, 1 dozen Air Guns, 1 dozen Sausage Stuffers, 3 gross Machine Oil, 1 dozen Corn Mills, 17 cases Hardware, 1 case Tools, 213 dozen Handles, 20 dozen Paint Brushes, 2 cases Hardware, 2 cases Tools, 2 gross Pencils, 1 case Sleeve Supporters and Carpenters' Tools, 10 gross Machine Oil, 5 dozen Wrenches, 3 dozen Axes, 40 dozen Hatchets, 7 packages Hardware, 1 dozen Meat Choppers, 2 cases Hardware, 4 packages Tools, 1 dozen Air Guns, 2 dozen Carpet Sweepers, 2 gross Egg Beaters, 48 dozen Axes, 12 dozen Hatchets, 4 bundles Barrow Parts, 1 case Hardware, 2 gross Wood Spoons, 4 dozen Pails, ½ dozen Bowls, ½ dozen Guns, 3000 Cartridges, 1 case Carriage Drills, 7 cases Hardware, 3 gross Axle Grease, 1 case Tools, 1 case Hardware, 68 dozen Hatchets, 12 dozen Picks, 146 dozen Handles, 103 dozen Mouse Traps, 2 cases Tools, 1 case Hardware, 12 dozen Axes, 10 gross Machine Oil, 1 Lawn Mower, 2 cases Hardware, 1 case Tools, 147 pairs Roller Skates.

Nason Mfg. Company,

71 Beekman street, New York, have issued, under date September 25, a discount sheet referring to their catalogue, April, 1886, with subsequent revisions. It thus gives prices on a large variety of goods in their line. The prices named on some of the leading goods are as follows:

	Dis. per cent.
Lap Welded American Charcoal Iron Boiler Tubes.....	50
Wrought-Iron Pipe:	
On List prices as revised 23d March, 1887:	
Plain 1¼ inch and under, whole lengths.....	55
1½ in. and over.....	65
Galvanized, 1¼ in. and under, whole lengths.....	47½
Galvanized, 1½ in. and over, whole lengths.....	55
When cut to order, advance 5% on discount, and labor cutting charged extra.	
Extra and Double Extra Heavy W. I. Pipe:	
Plain 1¼ in. and under, whole lengths.....	50
1½ in. and over.....	60
When cut to order, advance 10% on discount, and cutting extra.	
Iron Hydraulic Pipe.....	Net
Heavy Drive Well Pump.....	Net
Light Galvanized Leader Pipe.....	50
Galvanized Adjustable Elbows.....	10
Spiral Riveted Pressure Pipe.....	50
Fittings for Spiral Riveted Pipe.....	20
Cast-Iron Drain, Water and Smoke Pipe.....	60
Cast-Iron Water and Gas Pipe.....	Market rates.
Lead Pipe, 6¼ cents per pound.....	Net
Cast-Iron Fittings.....	70
Bushings and Plugs.....	75&10
Cast-Iron Flanges.....	70

Branch Tees, Hook and Expansion Plates.....	67½
Malleable-Iron Rushings.....	75&10
Malleable-Iron Unions.....	67½
American Unions.....	45
Wrought-Iron Fittings:	
Quarter Bonds and Long Screws.....	67½
W. I. Couplings and Nipples, List Prices Revised on 20th January, 1887.....	67½
Cook Wrenches.....	60
Gas-Pipe Hooks, Wrought Iron.....	Net
Ceiling and Floor Plates.....	67½
Blake's Adjustable Pipe Hangers.....	30
Malleable-Iron Fittings.....	25
Iron Stop Cocks, 65&10%, with brass plugs.....	60&10
Foot Valves and Strainers:	
Iron Foot Valves and Strainers.....	65&10
Nason's Foot Valves and Strainers.....	60
Mushroom Strainers.....	25
Expansion Joints, Iron Body.....	65
Iron Body Valves, Brass Mounted:	
Standard Pattern.....	65&10
Heavy.....	50
Brass Valves, Cocks, &c.:	
Valves, Standard Pattern.....	60&10
Heavy.....	50
Steam Cocks, Standard.....	57½&10
Heavy Pattern.....	50&10
Expansion Joints, Heavy Pattern.....	50
Air Cocks.....	60&10
Cylinder Cocks.....	50&10
Gauge Cocks.....	55&10
Gas Cocks and Soldering Fittings.....	57½&10
Quick Opening Elevator Valves.....	50
Water Gauges.....	60&10
Nason's Improved Water Columns.....	15
Steam Gauge Cocks.....	55&10
Radiator Valves and Cocks:	
Radiator Angle Valves.....	60&10
Air Cocks.....	60&10
Jenkins' Radiator Angle Valves.....	60
Radiator Angle Valves with Spindle.....	60
Automatic Air Valves for Radiators:	
Breckenridge's patent.....	30
Davis'.....	25
Oil Cups.....	60&10
Lubricators.....	60&10
Steam Whistles.....	60&10
Single Bell Chime Whistles.....	10
Chime Steam Whistles.....	40
Whistle Valves.....	60
Brass Fittings.....	60&10
Brass Bushings.....	60&10
Steam Bibbs and Stops.....	50&10
Steam Swing Joints.....	50&10
Swinging Check Valves:	
Improved Pattern.....	35
Van Wies'.....	35
Patent Straightway Gate Valves:	
Haydenville Double Gate Valves.....	40
Ludlow Sliding Stop Valves.....	35
Peet Sliding Gate Valves.....	40
Jenkins' Straightway Gate Valves.....	35
Kennedy's Double Gate Valves.....	55
Eddy's.....	25
Chapman's Gate Valves.....	35
Jenkins' Globe and Angle Valves.....	60
Check Valves.....	60
Benton's Lubricators.....	60
Handy Drop Feed Lubricators.....	20
Nathan's Self-Acting Lubricators.....	20
Dreyfus' Self-Oilers.....	15
Engine Cups.....	15
Pickering Governors.....	20
Register's Ball Gauge Cocks.....	50
Steam Gauges.....	40
Nason's Ejectors or Siphon Pumps.....	25
Hancock's Inspirators.....	38½
Korting's Double Tube Injectors.....	15
Rue's Little Giant Injector.....	30
Return Bend or Box Coils.....	50
Ornamental Screens.....	50
Marble Tops.....	Net
Feed Water Heaters.....	50
Spiral Coils for Tanks.....	40
Heater Coils.....	40
Nason's Automatic Water Feeder.....	50
Double or Jacket Steam Kettles.....	25
Steam Dampers or Draft Regulators:	
For high pressure.....	25
Nason's low pressure, with Reservoir.....	20
Cheap Patterns.....	35
Brass Gas Fixture Fittings.....	60
Gas Fixture Brackets.....	50
Blunt's Universal Force Pumps.....	25
Cistern Pumps, Revolving Tops.....	45
Pitcher Spout Pumps.....	55
Anti-Freezing Well Pumps.....	40
Deep Well Pump Standard.....	40
Force Pump on Base.....	40
Double Acting Force Pumps.....	35
Hydraulic Rams.....	25
Anti-Freezing Hydrant.....	50
Street Washers.....	50
Drive Well Points.....	50
Plain Stops.....	55&10
Shower Bath Cocks.....	55&10
Plain, Hose and Wash Tray Bibbs—ground joints.....	55&10
Hydrant Cocks and Corporation Stops.....	55&10
Compression Brass Work:	
Plain Hose and Wash Tray Bibbs.....	50&10
Straight Wash Tray Bibbs.....	50&10
Hopper Cocks.....	50&10
Rough Stops.....	55&10
Basin Cocks.....	50&10
Compression Double Bath Cocks.....	50&10
Chain Stays.....	50&10
Hose Bibb Ends.....	55&10
Sink, Bath or Wash Tray Plugs.....	55&10
Valve Couplings.....	55&10
Hose Pipes.....	55&10
Hose Sprinklers.....	55&10
Hose Couplings and Nipples.....	55&10
Connelly's Street Washers and Stop Cocks.....	25
Entire Discharge Cistern.....	20
Bartholomew Valve Closets.....	20
Single-Acting Lift Pumps.....	60
Copper Balls.....	30
Du Bois Lead Traps.....	Net
Copper Range Boilers from Revised List.....	20
Iron Range Boilers, 40 gallons and smaller.....	60
Copper Bath Tubs, from revised prices.....	30

Cast-Iron Pipe and Fittings, up to 6 inch.....	60
larger sizes.....	50
Cast-Iron Traps, up to 6 inch.....	55
larger sizes.....	50
" Pipe Fixtures.....	55
Cast-Iron Sinks, Square Corner and Half Round:	
Plain, 50; Galvanized and Enameled.....	40
Slop Sinks.....	40
Sink Legs.....	40
Sink Backs.....	40
Sink Strainers.....	40
Plug Sink Strainers.....	40
Sink Couplings.....	40
Iron Sinks, Traps, Cess Pools and Plates.....	40
Stop Cock and Street Washer Boxes.....	40
Wash Basins and Urinals.....	40
Hoppers.....	40
Hoppers, long or short.....	40
Boiler Stands.....	40
Iron Tanks.....	35
Improved Pipe Cutting and Threading Machines.....	15
Patent I X L Pipe Cutting and Threading Machines.....	5
Bolt Threading and Nut Tapping Attachment.....	10
Malleable Iron Stocks and Dies.....	40
Solid Dies, right or left.....	40

J. F. Wollensak's Sample Case.

J. F. Wollensak, manufacturer of Locksmiths' and other Hardware specialties, 225 to 229 Lake street, Chicago, has invented

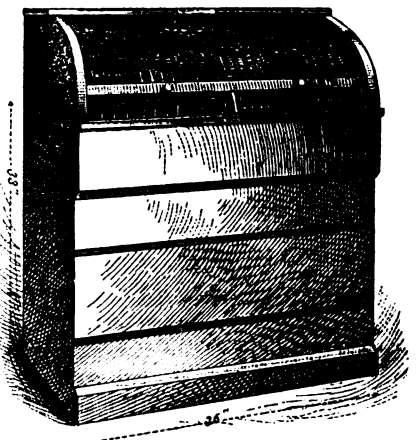


Fig. 1.—J. F. Wollensak's Sample Case.

a sample case of striking merit, which he uses for displaying samples of Keys, but which is well adapted for a variety of other goods. Two illustrations of this case are presented herewith. One shows the case complete, with the lid partly

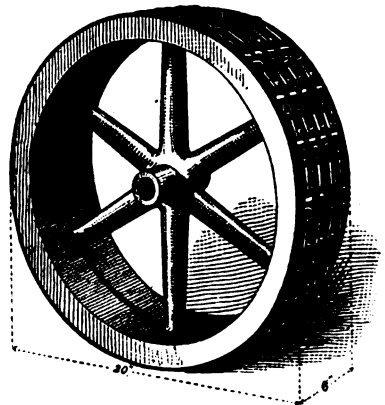


Fig. 2.—Detail of Sample Case.

open. The other shows one of the pulleys or rolls on which the samples are fastened. The pulleys, of which six are thus used, are made of cast iron, with the rim incased in wood. Billiard cloth is fastened on the face of the pulley to form a background for the samples, which are secured in their places by small staples. Space is left under each row of samples for price tags. The pulleys used in this case are 20 inches in diameter, outside measurement, with a face 6 inches wide. They revolve on the shaft independently, screw-eyes being inserted at frequent intervals on their face to take hold of when turning

were dealers on the subject, both through the columns of *The Metal Worker* and by direct correspondence.

The Cipher Competition.

Since publishing the solutions to the cipher problem presented in *The Iron Age* of August 30 we have received the following from a correspondent at Greenville, Miss. The date of his letter is sufficient evidence that he had not seen the previous solutions, so we take pleasure in presenting his method of solving the enigma.

In *The Iron Age* of recent date I find a cipher problem for which solutions are invited: 6ol = akl; hence l must be 2, 4, 6 or 8. 6r = lt; hence l must be less than 6. If r is 4 the product would be lr. Hence l must be 4, and the only other number that will make a product ending with l (4) is s or 9. Hence we get l = 4; r = 7; t = 2 and s = 9. The remainder of the problem is worked out as follows:

$r \times 6 = lt$
 $7 \times 6 = 42$
 $s \times 6 = wt$
 $9 \times 6 = 54$
 $w \times 6 = am$
 $5 \times 6 = 30$
 $a \times 6 = ek$
 $3 \times 6 = 18$
 $tae \times 6 = eako$
 $231 \times 6 = 1386$
METAL WORKS
 0 1 2 3 4 5 6 7 8 9

After working out the above problem, on looking behind me on one of the boxes I saw the words I use written out in the following cipher. Perhaps some of your readers might wish to solve it:

	Each.	$\frac{1}{2}$ doz.
Pocket Knives..No. 15.....	e.....na	
" No. 41P.....	ts.....bin	
" No. 472I.....	nh.....anc	
" No. 934I.....	cb.....isc	
" No. 841S.....	hci.....cht	

Equalization of Stove Prices.

With stoves manufactured in as many different parts of the country as at present, and with a very large consumptive demand at points remote from the foundries, the need of branch houses located at prominent distributive points becomes very apparent. When, for example, a half dozen foundries have established warehouses and their managing representatives at a certain point, there is nothing more natural nor anything more advantageous to all concerned than a general understanding about prices. Otherwise indiscriminate cutting would soon prevail, and profits would rapidly disappear. With a friendly understanding established in this way things are very likely to run along smoothly until some untoward event disturbs the harmony. If, for further example, one of the foundries with aggressive enterprise pushes out a new branch, say 500 miles or more toward the great consuming territory of the country, and begins to supply stoves from that point at the same rates as are made at home or at the distributing center where the original branch houses were located, the other concerns are at once placed at a disadvantage, and soon see that something must be done in order to hold their trade. The result of such circumstances, as we have briefly outlined, are sometimes most disastrous. In other cases they are happily managed in a way to save great loss.

The situation in the West at the present time is very inadequately typified by the hypothetical instance above cited, but the little flurry in prices on certain lines of stoves which has caused the managers of branch houses in Chicago some uneasiness of late has for its cause circumstances in some particulars comparable with those we have described. Agreements to equalize prices, by which a concern situated near the consumer shall have no advantage,

in this one item at least, over those further away, stand at best on an uncertain foundation, and there is ever present the temptation to break them. Sharp competition and the natural jealousies of men in the same trade make it almost impossible for rival houses to govern themselves by agreements which in however slight a degree reduce their opportunities for trade to a point below that to which their geographical location would seem to entitle them. When a break occurs, however small it may be at first, the tendency is toward a stampede, and a stampede once instituted, irrespective of whom the original guilty party may be, it is very difficult to stop. If differences which have been troubling the Chicago houses and other Western concerns the past few weeks have been permanently and satisfactorily adjusted, and if the danger of a break in prices at the commencement of what promises to be an active season's trade has been averted, the stove industry at large is to be congratulated. The first reports that reached us were alarming in character, but later advices are reassuring, although it is still evident that there are some houses that are disposed to pursue their own course and to act independently of the others.

Agreements to equalize prices are not the only contracts which in the heat of competition it is convenient to break or modify to suit circumstances. The buyer of stoves watches the game with great interest and with entire willingness to take a hand in it whenever it may be to his advantage to do so. With freights to a given point conceded, he next turns his attention to a special discount for cash, or to an allowance for some other reason; or he tries to get invoices dated ahead as a concession for a liberal order to an over-anxious stove salesman. In one way or another he frequently manages to buy stoves below the market price. The different concessions, allowances and rebates which stove manufacturers are thus called upon to face at the present time are most serious in character, and promise to work great injury if not speedily stopped. What the remedy is, beyond fair trading and a decent respect for one's competitors, we shall not attempt to point out. We simply direct attention to these things because they are so frequently mentioned in our correspondence of late, and because they are uppermost in the mind of every managing stoveman.

The stove manufacturers of the entire country, and particularly those who find their largest market in the West, have before them, we believe, a season of large demand. The fall and winter at present promise well, and all that is needed to make it satisfactory in final results is healing the breaches that exist—in other words, closing up the ranks and standing shoulder to shoulder. Reports from the entire country continue to be favorable, and nothing, therefore, can be more foolish or disastrous at this time than a disagreement between leading concerns, or a competitive struggle for trade, that shall result in the demoralization of prices. Retailers are interested in the stability of prices to almost as great an extent as the manufacturer, and, therefore, the welfare of all is to be served by careful and conservative action.

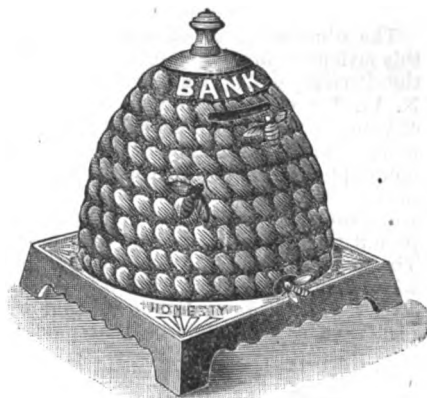
Why Stove Orders are Tardy.

It is generally conceded that the prospects in the stove trade at the present time are excellent, and yet we hear numerous complaints that orders are slow in coming in, and that, instead of experiencing the brisk trade at this season that is usual, some warehouses are comparatively dull. In view of the fact that the crops are good, business interests are prosperous, and that there is a very large demand to be supplied this fall, the question naturally arises: Why are stove orders tardy? The answer

is readily found, and is, in brief, the excellent shipping facilities which are at present enjoyed in almost every part of the land. The improved transportation enjoyed by the West has affected trade in Chicago, perhaps, more than at any other point. Orders are delayed simply because goods when bought can be shipped in short time. During the past week or ten days a considerable number of visitors have been in Chicago, and their presence has to some extent revived the recollections of former years when Chicago salesrooms were fairly thronged at certain seasons of the year by customers from distant localities. There is, however, less occasion for customers to visit Chicago at the present time than formerly, because the enterprise of manufacturers causes their travelers to call upon customers; while, on the other hand, the action of the Interstate Commerce law, which has tended to diminish the number of passes, has made it more expensive for dealers to visit the city. But, as already stated, the great increase in commercial facilities probably has much to do in influencing many dealers to withhold orders for stocks of stoves. They know that within a very short time from the receipt of an order the manufacturers will have their stoves on the way, and that they will be promptly delivered, whether the season be winter or summer. Railroads now reach almost every town of any importance in the Northwest, and many towns are served by two or more lines, between which there is great rivalry for business. Because of this rivalry the time for delivering goods by freight has been greatly shortened. Stoves can now be delivered in St. Paul in two days' time from Chicago, instead of a week as formerly. Denver is reached in four days, instead of two weeks. Shipments even to Los Angeles, Cal., are guaranteed in eight days, against the former time of a month.

The Bee Hive Bank.

Wm. Mitchell Gobeille, who is located at the corner of Monroe and Penn streets, Cleveland Ohio, has brought out an attractive addition to the general line of toy

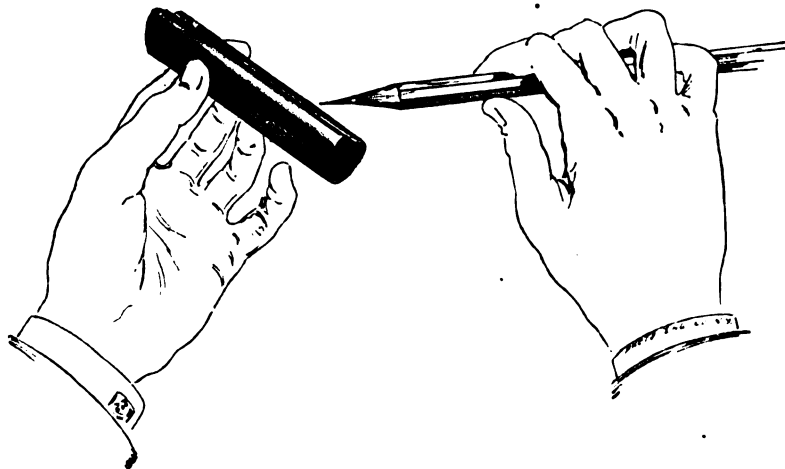


Bee Hive Bank.

banks which are at present before the public. It may be described as the Bee Hive Bank, and is very satisfactorily represented by the accompanying engraving. The ornamentation makes it resemble an old-fashioned straw beehive. The base measures 6 inches square, and the height is also 6 inches. The corners of the base are inscribed with the words, "Industry," "Honesty," "Economy" and "Temperance." The slot is adapted to receive anything from a silver dollar to the smallest coin. It is provided on the inside with a rubber piece, which prevents the coins from being rattled out. The bottom of the bank underneath the base is provided with a lock and key. By releasing the lock an opening is revealed in the base through which the savings may be withdrawn.

Duplex Pencil Pointer.

Kolesch & Co., 155 Fulton street, New York, are putting on the market a pencil pointer, designed especially for draftsmen's and artists' use, which is illustrated in the accompanying cut. It is intended for sharpening the lead of a pencil to a very fine point, either round or knife edged. It is made of brass, handsomely nickel-

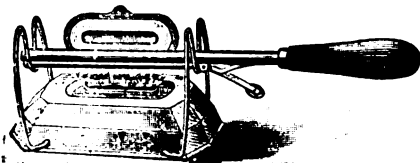


The Duplex Pencil Pointer.

plated, so arranged as to hold a piece of fine emery cloth in the position shown in the cut. This gives the abrading surfaces by means of which the pencil is pointed. The substitution of a new piece of emery cloth is easily accomplished, as the inside holder can be pushed out, when a new sheet can be readily inserted. The illustration represents the use of the pointer in giving a round point to a pencil, but if a flat edge is desired it is explained that the point may be pressed lightly in the groove of the sharpener and drawn lengthwise from end to end. The sharpener retails for 25 cents.

The Perfection Curling Iron and Heater.

The illustration given below represents this article, which is put on the market by the Perfection Mfg. Company, Rochester, N. Y., for whom it is made by Yawman & Erbe, of that city. The heater, which is 3½ inches long, is made of brass and nickel-plated. It is filled with cotton to prevent the spilling of the alcohol. The wick-holder is easily removable, so as to permit the convenient filling of the heater. The arms on which the curling iron rests while being heated, as shown in the cut, after the lid has been shut down, fold compactly, so as to make the heater occupy



The Perfection Curling Iron and Heater.

very little space. The form of the curling iron, which is 7 inches in length, is shown in the engraving. The points made by the manufacturers in regard to this neat and simple contrivance are—that there is no odor or smoke connected with its use, and that the iron will not soil the hands; that it can be carried in the pocket; that it gives an intense heat, heating the iron, it is claimed, in half a minute, and that it is

inexpensive. The heater and the iron are put up in a neat box, and it is anticipated that it will meet a want of the trade.

Labor-Saving Dust Pan.

The Cline Mfg. Company, 70 and 72 West Washington street, Chicago, are manufacturing a dust-pan of new design.

It is made of tin, neatly japanned, and is intended to lie flat on the floor, where it is held in position by the operator's foot, as shown in the accompanying cut. A projection extends beyond the point of the pan for this purpose, and it also has a hole



Labor-Saving Dust Pan.

punched in it by which the pan can be hung up. The pressure of the foot causes the edge of the pan to stick close to the floor so that none of the sweepings can pass under it. As the pan is not held by the hand, bending over is unnecessary. A handle is attached on the top of the pan so that it can be held by the hand when used as a crumb-pan. A patent has been applied for.

The Crown Picture Hanger.

The illustrations given below represent a new picture hanger, which is put on the market by the Brinkerhoff Company, Auburn, N. Y., of which a full description is given in their very complete catalogue, which is devoted to an exhibition of the

different styles and patterns which they are making. This hanger is intended to furnish something for the purpose of hanging pictures more artistic than the goods which are now generally in use, while



Fig. 1.—Crown Picture Hanger.—Wire Before Adjustment.

at the same time it possesses, it will be observed, special features. These hangers are intended to hold the pictures securely, their construction being such as to prevent the moving of the wire on the hook and the falling of the picture to the floor in case the fastening of the wire at one side of the frame should give way. The patent locking construction is a feature of these hangers, on which special emphasis is laid. The hanger is illustrated in the cuts, Fig. 1 showing the wire placed upon the hanger before adjustment, and Fig. 2 showing the wire adjusted in the position required for locking it. These picture hangers are made in different patterns and in a variety of finish. Besides the regular line of single hangers double hangers are also made which furnish means for suspending a picture from any desired point, even though the ends of the molding should meet at the point where it is desired to hang the picture. In these double hangers between the engaging hooks is an

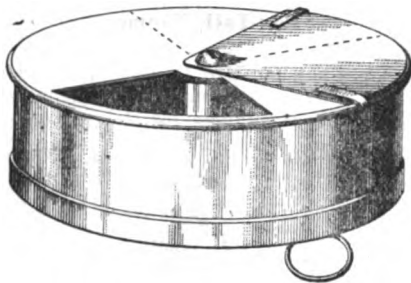


Fig. 2.—Crown Picture Hanger.—Wire Adjusted.

extra hanger from which a small picture can be suspended and be free from the supporting wires of the larger picture. Another modification of the same hanger is for use in connection with nails or knobs, in which the nail or the screw by which the knob is fastened passes through a hole in the upper part of the hanger, thus fastening it securely in place, and giving the advantages of the locking device.

Rivet Boxes.

In respect to the rivet box illustrated in Fig. 1, a correspondent writes referring to it as having been found very satisfactory in use: "I would like to submit a box that I made some time since, and which I have been using very satisfactorily for a term of months. I think it is the best box I have ever seen. I send by this mail a model, from which you will understand what I refer to. The box may be made with any number of bins to suit, and can be arranged to hang on the wall or carry in a tool box, and may be of such diameter as the user



Rivet Boxes.—Fig. 1.—A Novel Construction.

prefers. The one that I am using is 5½ inches in diameter and 1½ inches deep, and arranged to hold 4 sizes of rivets; by making the box larger more sizes could be included. There is no trouble about the rivets catching in the sliding top, provided the partitions are brought up to the slide cover. The box referred to has the special advantage of never spilling and mixing the rivets. It is equally serviceable for use for stove bolts."

From the model which our correspondent sends us we have had the accompanying engraving prepared. The box, it will be noticed, is drum-like in shape with one head put on in such a way as to turn by means of a central pivot. This head has a quarter opening through which the rivets may be withdrawn. When one division of the box is open all the others are closed. For the purpose of shutting up the box entirely an auxiliary sliding lid is provided, which shuts over the opening. As mentioned by our correspondent, the box may be carried in a tool box, or it may be hung on the wall. The model that has been sent us is arranged for hanging up.

Another style of rivet box is illustrated below, Fig. 2, concerning which our correspondent says: "Inclosed I hand you a sketch of a rivet box for holding 14 sizes; or it may be used for holding seven sizes of

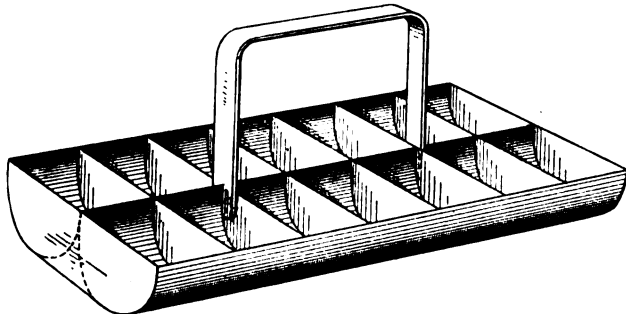
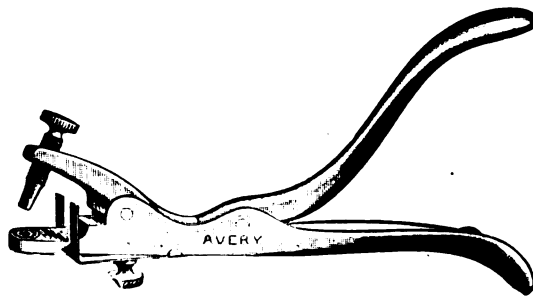


Fig. 2.—A Useful Rivet Box.

rivets, one-half of each being tinned and the other half black. When using two or more kinds of rivets, a box constructed on this plan is very handy to pick from. It is readily placed in front of the workman on the bench. The usual way of taking a box with one kind of rivets, and then being compelled to go after another box

with a different kind of rivets as the work changes, is very expensive, and by the use of this device is entirely avoided. The box here shown can be made by taking a sheet of tin

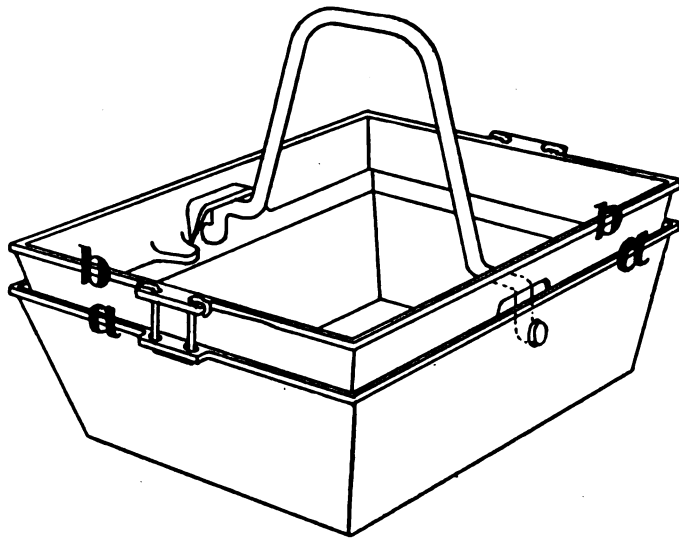
saw will be observed, it being fastened readily at any desired point by means of a thumb-nut on the lower side. Besides being used as a saw set, this tool also will serve as a punch, the manner in which the



Avery's Combined Punch and Saw Set.

12 x 14 inches, dividing it the 12-inch way into two pieces, and the 14-inch way in seven pieces for the partitions. Then form the pieces so as to make a tube 14 inches long. Then bend it backward in the middle, thus forming it in the

punch tube is attached to the arm being shown in the illustration. The simplicity of this article and its efficiency and convenience for the purposes for which it is designed are points that are made in regard to it by the manufacturers. Each



New Safety Ash Pan.

shape of half tubes, the adjacent sides of which are connected; next solder on the two ends, the shape of which is clearly shown in the engraving. Afterward insert the partitions, and supply a handle.

tool is fully nickel-plated and is packed in a separate box with directions for use.

Combined Leather Punch and Saw Set.

W. G. Avery Mfg. Company, Cleveland, Ohio, are manufacturing Avery's Com-

New Safety Ash-Pan.

Arthur W. Walker, 31 Union street, Boston, Mass., has recently devised a new safety ash-pan, the general features of which are illustrated in the accompanying engraving. As indicated in the cut, there is a second rim, *b*, inside of the usual top rim, *a*. By raising the handle the inside rim rises about an inch and this prevents the ashes from scattering. When the handle is lowered, after the pan is empty, the rim falls down in position. The motion of the upper rim is limited by wire loops or rivets shown at the ends. The same result may be accomplished by rising flaps, false bottom or other device, by means of which the capacity of the pan is increased by raising the handle. The rims, we are informed, may be of either cast or sheet iron; but if the upper rim, *b*, is of cast iron, the rim *a* may be dispensed with. The appliance is said to be exactly adapted to end hearth ranges.

The largest sorghum sugar mill in the country has commenced manufacturing at Topeka, Kan., and is expected to turn out 1,000,000 pounds of sugar this season and about 150,000 gallons of syrup. Farmers are paid \$2 per ton for the cane, and the product of 1800 acres will be consumed.

Panel Gauge, Trammel and Measuring Rod.

Fig. 1 of the engravings represents a new tool which the Humphrey Tool Company, of Warren, Mass., are putting upon the market. It is known as Humphrey's Panel Gauge, and combines with this function a trammel and measuring rod.

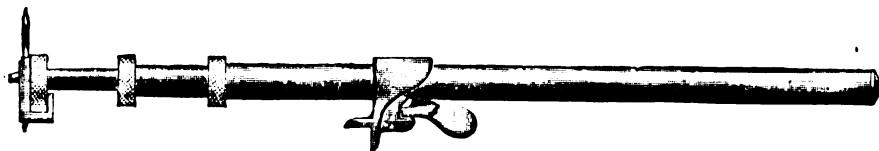


Fig. 1.—Panel Gauge, Trammel and Measuring Rod.

The tool is designed for wood-workers where the work is too wide for the common gauge. It consists of three sections, adapted to telescope together, as shown in the engraving, which represents the tool as partly extended. The sections are held at any length required by the thumb nuts which terminate the different parts, and which are arranged to clamp one part against the other. A smaller nut is pro-

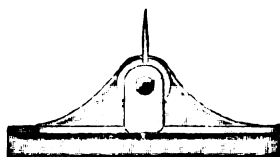


Fig. 2.—End View of Trammel Gauge.

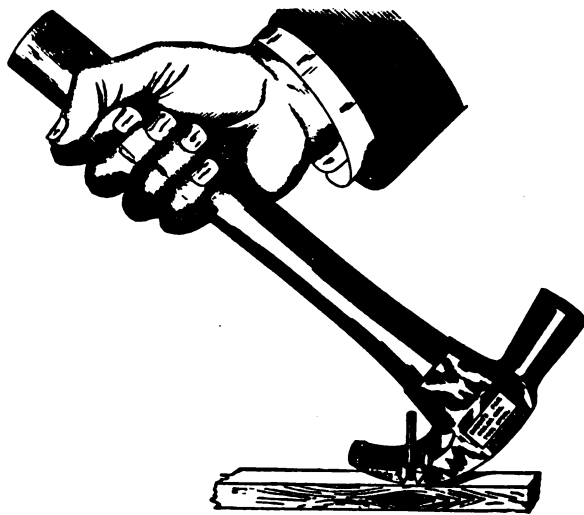
vided on the end, which is useful for fine adjustments. A pencil may be passed through the head, and the tool in this form can be used as a trammel. Or the head may be removed, and the bar used as a measuring-rod, being in this form of sufficient length to measure a common window or door. The second engraving, Fig. 2, shows a view of the device end

at best was unhandy, not only in use but to take care of when not in use. The compact form in which this tool can be placed when out of use is in itself a great advantage. The tooth is extended on the top side, so as to be used as a point or pivot on which to swing when a pencil is passed through the head, converting the tool into a trammel. Each end of the rod

is furnished with a point to facilitate the use of the device as a measuring-rod. By this means the points of contact, as for example for measuring a door or other opening, are reduced to the smallest possible surface.

The Kizer Hammer.

The Kizer Hammer Company, Washington, D. C., for whom Danforth & Pike, 114 Washington street, Boston, Mass., are agents, are introducing to the trade a new hammer called the "Kizer," which is represented in the accompanying illustration. It will be seen that this hammer differs from a regular nail hammer in the construction of the claw, which has a new device for drawing nails and terminates in a blade. The nail is drawn by means of a slot in the side, which bites or grips the nail at the point of contact. It is pointed out that the grip being transverse to the slot instead of parallel to it, as in other hammers, it is much stronger and the nail is drawn with certainty. It is claimed that wire nails, which are coming into such general use and are drawn with so much difficulty with the regular hammers, are drawn readily with this hammer, which from its construction is referred to a



The Kizer Hammer.

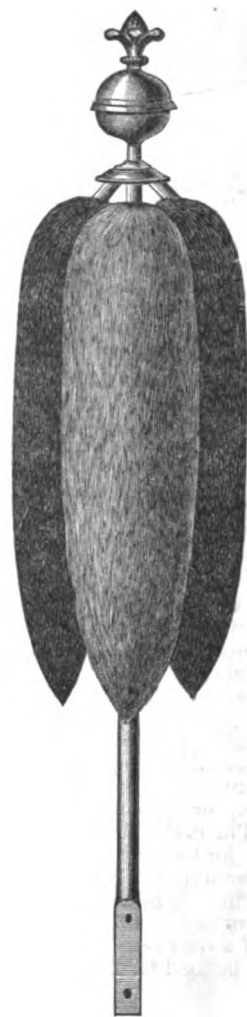
on, so to speak, and indicates the nature of the head and also of the right-angled groove in the head, shown in profile in the previous engraving, by which the gauge is operated. The model before us is well made, the parts being carefully fitted and the workmanship excellent. The sections of the rod are plated, and the head japanned. This tool takes the place of a common gauge where the work is too wide for it. The old way was to use a bar of wood or a strip of metal, according to circumstances, which

adapted to drawing a headless nail as well as one with a head. Its utility in drawing screws, the heads of which are broken off, is also alluded to, and it is claimed that if the screw projects sufficiently to permit the hammer to grip it it can be withdrawn. In the repairing of houses and frequently in the construction of new buildings it is desirable to remove the trimmings, such as moldings, &c., and to take the nails therefrom is difficult, as they cannot be driven through the face without damaging the molding, so that it is necessary frequently

to cut off the nails. It is claimed that this trouble is avoided by using the Kizer hammer, as the head can be drawn through from the back. The blade of the hammer is described as finely tempered and given an edge, as shown, so that it may be used as a box scraper, for cutting hoops, beveling the edges of boxes preparatory to hooping them, and other uses, as an adze or draw knife, while it can also be used as a small vise for filing bolts, &c. The Kizer hammer is stated to be forged from the best tool steel and is made in two styles, the plain and the bell face, and the manufacturers guarantee to replace every hammer which is broken in legitimate use.

Fox-Tail Plumes.

The Chapman Mfg. Company., Meriden, Conn., have been making additions to their line of plumes for sleighs, one of



Fox-Tail Plumes.

which is represented in the accompanying illustration, which is referred to as one of the latest novelties in sleigh decoration. The plumes are used, as our readers will understand, on the dash of fine turnouts, and are furnished gray, red or black. Similar plumes are also made in several other styles besides that illustrated in the cut.

A Large Steel Casting.—Reports of large steel castings come up from time to time. Among those of which we have lately heard is one made at the Homestead works of Carnegie, Phipps & Co., Pittsburgh, Pa. It was for the 42-inch cylinder of the 3000-ton shear in the slabbing mill. It weighed 54,600 pounds, and is a reserve casting for the tool in question. The same company have made a number of castings weighing 40,000 pounds and over.

CURRENT HARDWARE PRICES.

OCTOBER 3, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Caps, Percussion, 1000—	
Black & Goldmark's	
F. L. Waterproof, 1-10's	50¢
M. B. Trimmer Edge, 1-10's	55¢
M. B. Ground Edge, Central Fire, 1-10's	75¢
Double Waterproof, 1-10's	1.40
Market Waterproof, 1-10's	50¢
G. D.	35¢
S. B.	30¢
Union Metallic Cartridge Co.	
F. C. Trimmer	50¢
F. L. Ground	55¢
Con. Fire Ground	70¢
Double Water-proof	75¢
Double Water-proof, in 1-10's	1.40
S. B. Genuine Imported	45¢
Wey's B. B.	54¢
Wey's L. Waterproof, Central Fire	1.60

Cartridges.

Blm Fire Cartridges	dis 50¢ & 52¢
Blm Fire Military	dis 15¢ & 2¢
Central Fire Pistol and Rifle	dis 25¢ & 2¢
Central Fire Military & Sporting	dis 15¢ & 2¢
Blank Cartridges, except 22 and 32 cal., an additional 10¢ over above discounts.	
Blank Cartridges, 22 cal.	dis 1.75, dis 2¢
Blank Cartridges, 32 cal.	dis 1.50, dis 2¢
Primed Shot and Bullets	dis 1.65 & 2¢
B. B. Caps, Round Ball	dis 1.75, dis 2¢
B. B. Caps, Conical Ball, Swaged	dis 2.00, dis 2¢

Primers.

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells)	dis 1.00, dis 2¢
All other Primers, all sizes	dis 1.20, dis 2¢

Shells.

First quality, 4, 8, 10 and 12 gauge, dis 25¢ & 10¢ & 2¢	
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30¢ & 10¢ & 2¢
Star, Club, Rival and 10 gauge, \$9 list	dis 38¢
Climax Brands, 12 gauge, \$8 list	dis 21¢ & 2¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢ & 10¢ & 2¢
Seibell's Combination Shot Shells	dis 15¢ & 2¢
Brass Shot Shells, 1st quality	dis 60¢ & 2¢
Brass Shot Shells, Club, Rival, Climax	dis 65¢ & 2¢
A. R. & C. Co., 10 & 12 gauge, dis 40¢ & 2¢	
A. R. & C. Co., "Special," 14 gauge, dis 30¢ & 10¢ & 2¢	
A. R. & C. Co., "Special," 10 & 12 gauge, dis 40¢ & 2¢	
Fowler's Patent, 10 & 12 gauge, \$100	dis 8.75

Shells Loaded.

List No. 19, 1887	dis 20¢ & 10¢
C. M. C. & W. R. A.—B. E., 11 up	\$2.00
U. M. C. & W. R. A.—B. E., 9 & 10	2.30
U. M. C. & W. R. A.—B. E., 7 & 8	2.60
U. M. C. & W. R. A.—P. E., 11 up	3.10
U. M. C. & W. R. A.—P. E., 9 & 10	3.40
U. M. C. & W. R. A.—P. E., 7 & 8	4.00

Wey's B. B.

Wey's B. B., 11 up	dis 1.75
Wey's B. B., 10 & 12 gauge	dis 1.50

Wey's B. B.

Wey's B. B., 10 & 12 gauge	dis 1.50
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Wey's B. B.

Wey's B. B., 10 & 12 gauge	dis 1.50
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Wey's B. B.

Wey's B. B., 10 & 12 gauge	dis 1.50
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Wey's B. B.

Wey's B. B., 10 & 12 gauge	dis 1.50
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Patent Peg, Plain Top.

Patent Peg, Plain Top	dis 10.00
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Patent Peg, Leather Top.

Patent Peg, Leather Top	dis 12.00
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Awls, Brad Sets, &c.

Awls, Brad Sets, &c.	dis 11.70
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Awls, Sewing, Common.

Awls, Sewing, Common	dis 11.70
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Awls, Shouldered Peg.

Awls, Shouldered Peg	dis 11.70
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Awls, Patent Peg.

Awls, Patent Peg	dis 11.70
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Awls, Shouldered Brad.

Awls, Shouldered Brad	dis 11.70
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Awls, Handled Brad.

Awls, Handled Brad	dis 11.70
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Awls, Handled Scratch.

Awls, Handled Scratch	dis 11.70
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Awls, Booked Scratch.

Awls, Booked Scratch	dis 11.70
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Awls and Tool Sets.

Awls and Tool Sets	dis 11.70
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Miller's Falls Adj. Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Miller's Falls Adj. Tool Hds.	dis 11.70
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Henry's Combination Haft.

Henry's Combination Haft	dis 11.70
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Brad Sets, Stanley's Excelsior, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Brad Sets, Stanley's Excelsior	dis 11.70
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Brad Sets, Stanley's Excelsior, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Brad Sets, Stanley's Excelsior	dis 11.70
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Awls and Special Brands.

Awls and Special Brands	dis 11.70
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First quality.

First quality	dis 11.70
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Others.

Others	dis 11.70
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Awls, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Awls, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 11.70
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Awls, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Awls, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 11.70
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Awls, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Awls, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99,
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World's Best. 7 gross, No. 1, \$12.00; No. 2, \$24.00.
No. 3, \$36.00. dis 50x10 1/2
Universal. 7 gross, No. 1, \$12.00; No. 2, \$24.00.
Domestic. 7 gross, No. 1, \$12.00; No. 2, \$24.00.
Champion. 7 gross, No. 1, \$12.00; No. 2, \$24.00.

Cards.
Horse and Curry. dis 10x10 1/2 @ 10x10 1/2
Cotton. New list, Aug. 1888. dis 10 @ 10x10 1/2
Wool. dis 10 @ 10x10 1/2

Carpet Stretchers.
Cast Steel, Polished. 7 gross, \$12.00
Cast Iron, Steel Points. 7 gross, \$12.00
Socket. 7 gross, \$12.00
Bulldog. 7 gross, \$12.00

Carpet Sweepers.
Bissell No. 5. 7 gross, \$12.00
Bissell No. 7 New Drop Fan. 7 gross, \$12.00
Bissell Grand. 7 gross, \$12.00
Grand Rapids. 7 gross, \$12.00
Crown Jewel. No. 1, \$12; No. 2, \$12; No. 3, \$20
Magic. 7 gross, \$12.00
Jewel. 7 gross, \$12.00
Improved Parlor Queen, Nickel Trimmed. 7 gross, \$12.00
Improved Parlor Queen, Japanese Trimmed. 7 gross, \$12.00

Excelsior.
Parlor Queen. 7 gross, \$12.00
Housewife's Delight. 7 gross, \$12.00
Queen, with band. 7 gross, \$12.00
King. 7 gross, \$12.00
Wood Improved. 7 gross, \$12.00
Mub. 7 gross, \$12.00
Cog Wheel. 7 gross, \$12.00

Cartridges—See Ammunition.

Casters.
New list:
Flat. 7 gross, \$12.00
Shadow Socket. 7 gross, \$12.00
Deep Socket. 7 gross, \$12.00
Yale Casters, list May, 1888. 7 gross, \$12.00
Yale Gem. 7 gross, \$12.00
Martin's Patent (Phoenix). 7 gross, \$12.00
Payson's Anti-friction. 7 gross, \$12.00
"Giant" Truck Casters. 7 gross, \$12.00
Stationary Truck Casters. 7 gross, \$12.00

Outfit Leaders.
Mumson, Beckley & Co.'s. 7 gross, \$12.00
Sargent's. 7 gross, \$12.00
Hotchkiss. 7 gross, \$12.00
Peck Stow & W. Co. 7 gross, \$12.00

Upholstery.
Trace 6-10-8, exact sizes, 7 pair, \$1.00
Trace 6-10-8, exact sizes, 7 pair, \$1.00
Trace 7-10-8, exact sizes, 7 pair, \$1.11
Nott. Traces, "Regular" sizes 34 net 7 pair less than exact.

Log, Fifth, Stretcher, and other rancy Chains, list Nov. 1, 1888.
American Coll. 8-10 1/2 6-10 1/2 7-10 1/2 8-10 1/2
In case lots, 8-10 1/2 6-10 1/2 7-10 1/2 8-10 1/2
Less than case lots, add 1/4 @ 1/2 7 pair
German Coll. list of June 30, 1887. 7 gross, \$12.00
Ger. Halter Chain, list of June 30, 1887. 7 gross, \$12.00

Covert Halter, Hitching and Breast.
Covert Traces. 7 gross, \$12.00
Goida Halter Chain. 7 gross, \$12.00
Galvanized Pump Chain. 7 gross, \$12.00
Jack Chain, Iron. 7 gross, \$12.00
Jack Chain, Brass. 7 gross, \$12.00
Chalk. — White. 7 gross, \$12.00
Red. 7 gross, \$12.00
Blue. 7 gross, \$12.00
White Crayons. 7 gross, \$12.00
Chalk Lines. — See Lines.

Chisels.
Socket Framing and Firmer.
P. S. & W. 7 gross, \$12.00
New Haven and Middlesex. 7 gross, \$12.00
Mix. 7 gross, \$12.00
Ohio Tool Co. 7 gross, \$12.00
Luck Bros. 7 gross, \$12.00
Merrill. 7 gross, \$12.00
L. & J. White. 7 gross, \$12.00
Withey and Douglas. 7 gross, \$12.00
Tanged Firmers. 7 gross, \$12.00
Tanged Firmers, Butcher's. 7 gross, \$12.00
Tanged Firmers, Spear & Jackson's. 7 gross, \$12.00
Tanged Firmers, Buck Bros. 7 gross, \$12.00
Cold Chisels. 7 gross, \$12.00

Chucks.
Seach Patent. 7 gross, \$12.00
Morse's Adjustable. 7 gross, \$12.00
Banbury. 7 gross, \$12.00
Syracuse, Hals Pat. 7 gross, \$12.00
Clamps.
Providence Tool Co.'s Wrought Iron. 7 gross, \$12.00
Adjustable, Gray. 7 gross, \$12.00
Adjustable, Lamper's. 7 gross, \$12.00
Adjustable, Snow's. 7 gross, \$12.00
Adjustable, Hammer's. 7 gross, \$12.00
Adjustable, Stearns'. 7 gross, \$12.00
Stearns' Adjustable Cabinet and Corner. 7 gross, \$12.00
Cabinet, Sargent's. 7 gross, \$12.00
Carriage Makers', Sargent's. 7 gross, \$12.00
Sherard Mfg. Co. 7 gross, \$12.00
Warner's. 7 gross, \$12.00
Saw Clamps. 7 gross, \$12.00

Clips.
Norway, Axle, 1/4 & 5-16. 7 gross, \$12.00
Second grade Norway Axle, 1/4 & 5-16. 7 gross, \$12.00
Superior Axle Clips. 7 gross, \$12.00
Norway Spring Bar Clips, 5-16. 7 gross, \$12.00
Wrought Iron Police Clips. 7 gross, \$12.00
Steel Police Clips. 7 gross, \$12.00
Baker Axle Clips. 7 gross, \$12.00
Cheeks, Brass. — Hardware list. 7 gross, \$12.00
Coffee Mills.
Box and Side, list revised Jan. 1, 1888. 7 gross, \$12.00
American, Enterprise Mfg. Co. 7 gross, \$12.00
The "Swift" Lane Erie. 7 gross, \$12.00

Compasses, Dividers, etc.
Compasses, Callipers, Dividers. 7 gross, \$12.00
Bemis & Call Co.'s Dividers. 7 gross, \$12.00
Bemis & Call Co.'s Compasses & Callipers. 7 gross, \$12.00
Bemis & Call Co.'s Wing & Inside or Outside. 7 gross, \$12.00
Bemis & Call Co.'s Double. 7 gross, \$12.00
Bemis & Call Co.'s (Call's Patent Inside). 7 gross, \$12.00
Excelsior. 7 gross, \$12.00
J. Stevens & Co.'s Callipers and Dividers. 7 gross, \$12.00
Starrett's Spring Callipers and Dividers. 7 gross, \$12.00
Starrett's Lock Callipers and Dividers. 7 gross, \$12.00
Starrett's Combination Dividers. 7 gross, \$12.00

Callipers' Teels.
Bradley's. 7 gross, \$12.00
L. & J. White. 7 gross, \$12.00
Albertson Mfg. Co. 7 gross, \$12.00
Beatty's. 7 gross, \$12.00
Sandusky Tool Co. 7 gross, \$12.00
Corkscrews.
Mumson & Beckley Mfg. Co. 7 gross, \$12.00
Cough's Patent. 7 gross, \$12.00
Morse Bros. & Hubert. 7 gross, \$12.00
Cork Knives and Outlets.
Bradley's. 7 gross, \$12.00
Wadsworth's. 7 gross, \$12.00
Oradice. — Grain. 7 gross, \$12.00
Crown Bars. — Cast Steel. 7 gross, \$12.00
Iron, Steel Points. 7 gross, \$12.00

Curry Combs.
Fitch. 7 gross, \$12.00
Rubber. 7 gross, \$12.00
Perfect. 7 gross, \$12.00

Curtain Pins. — Silvered Glass.
White Enamel. 7 gross, \$12.00

Outlets.
Beaver Falls and Booth's. 7 gross, \$12.00
Wostenholme. 7 gross, \$12.00

Dampers, etc.
Dampers, Buffalo. 7 gross, \$12.00
Huffalo Damper Clips. 7 gross, \$12.00
Crown Damper. 7 gross, \$12.00
Excelsior. 7 gross, \$12.00

Dividers—See Compasses.

Leg Callipers.
Kimbosel, Pope & Stevens' list. 7 gross, \$12.00
Leather, Pope & Stevens' list. 7 gross, \$12.00
Brass, Pope & Stevens' list. 7 gross, \$12.00

Door Springs.
Torrey's Rod, regular size. 7 gross, \$12.00
Gray's. 7 gross, \$12.00
See Rod. 7 gross, \$12.00
Warner's. 7 gross, \$12.00
Gem (Coll.) list April 19, 1888. 7 gross, \$12.00
Star (Coll.) list April 19, 1888. 7 gross, \$12.00
Victor (Coll.). 7 gross, \$12.00
Champion (Coll.). 7 gross, \$12.00
Philadelphia. 7 gross, \$12.00
Cowell's. No. 1, 7 gross, \$12.00; No. 2, \$15.00; No. 3, \$20.00
Hubber, complete. 7 gross, \$12.00
Hercules. 7 gross, \$12.00
Shaw Door Check and Spring. 7 gross, \$12.00
Elliot's Door Check and Spring. 7 gross, \$12.00

Drawing Knives.
P. S. & W. 7 gross, \$12.00
M. 7 gross, \$12.00
New Haven and Middlesex. 7 gross, \$12.00
Merrill. 7 gross, \$12.00
Withey and Douglas. 7 gross, \$12.00
Watrous. 7 gross, \$12.00
L. & J. White. 7 gross, \$12.00
Bradley's. 7 gross, \$12.00
Adjustable Handle. 7 gross, \$12.00
Wilkinson's Folding. 7 gross, \$12.00

Drill and Drill Stocks.
Blacksmith's Self-Feeding. 7 gross, \$12.00
Breast, P. S. & W. 7 gross, \$12.00
Breast, Wilson's. 7 gross, \$12.00
Breast, Miller's Falls. 7 gross, \$12.00
Breast, Bartholomew's. 7 gross, \$12.00
Ratchet, Merrill's. 7 gross, \$12.00
Ratchet, Ingersoll's. 7 gross, \$12.00
Ratchet, Parker's. 7 gross, \$12.00
Ratchet, Whitney's. 7 gross, \$12.00
Ratchet, Weston's. 7 gross, \$12.00
Ratchet, Moore's Triple Action. 7 gross, \$12.00
Whitney's Hand Drill, Plain, \$11.00, Adjustable. 7 gross, \$12.00
Wilson's Drill Stocks. 7 gross, \$12.00
Automatic Boring Tools. 7 gross, \$12.00
Twist Drills.
Morse. 7 gross, \$12.00
Standard. 7 gross, \$12.00
Syracuse. 7 gross, \$12.00
Cleveland. 7 gross, \$12.00
Williams. 7 gross, \$12.00

Drill Bits. — See Augers and Bits.

Drill Chucks. — See Chucks.

Dripping Pans. — Small sizes.
Large sizes. 7 gross, \$12.00

Egg Beaters.
National. 7 gross, \$12.00
Family T. & S. Mfg. Co. 7 gross, \$12.00
Kington (Standard Co.). 7 gross, \$12.00
Acme (Standard Co.). 7 gross, \$12.00
Duplex (Standard Co.). 7 gross, \$12.00
Rival (Standard Co.). 7 gross, \$12.00
Triumph T. & S. Mfg. Co. 7 gross, \$12.00
Advance, No. 1. 7 gross, \$12.00
Bryant's. 7 gross, \$12.00
Ayres' Spiral. 7 gross, \$12.00
Double (Hamblin & Russell Mfg. Co.). 7 gross, \$12.00
Kiss (Hamblin & Russell Mfg. Co.). 7 gross, \$12.00
Triple (Hamblin & Russell Mfg. Co.). 7 gross, \$12.00
Spiral (Hamblin & Russell Mfg. Co.). 7 gross, \$12.00
Paine, Diehl & Co's. 7 gross, \$12.00

Egg Poachers.
Buffalo Steam Egg Poachers, 7 gross, \$12.00
No. 2, \$20.00
Electric Bell Meters. — Wollensak's. 7 gross, \$12.00
Biglow & Dowse. 7 gross, \$12.00
Emery. 7 gross, \$12.00

Enamelled and Tinned Ware. — See Hollow Ware.

Keutheben Pins.
Iron, list Nov. 11, 1888. 7 gross, \$12.00
Brass. 7 gross, \$12.00

Keutheben Pins.
Door Lock. 7 gross, \$12.00
Brass Thread. 7 gross, \$12.00
Wood. 7 gross, \$12.00

Knives.
Fenn's. 7 gross, \$12.00
Bohren's Patent Rubber Ball. 7 gross, \$12.00
Fenn's Cork Stope. 7 gross, \$12.00
Star. 7 gross, \$12.00
Fenn's Patent Petroleum. 7 gross, \$12.00
Went's Patent Key. 7 gross, \$12.00
Anchor Lock. 7 gross, \$12.00
Metallic Key, Leather Lined. 7 gross, \$12.00
Cork Lined. 7 gross, \$12.00
Burnside's Red Cedar. 7 gross, \$12.00
J. Sommer's Pearless Best Block Tin Key. 7 gross, \$12.00
J. Sommer's IXI, lat quality, Cork Lined. 7 gross, \$12.00
J. Sommer's Diamond Look. 7 gross, \$12.00
J. Sommer's Perfection, Fla. Red Cedar. 7 gross, \$12.00
J. Sommer's Goodenough Cedar. 7 gross, \$12.00
Self-Measuring, Enterprise. 7 gross, \$12.00
Self-Measuring, Lane's. 7 gross, \$12.00
Self-Measuring, Victor. 7 gross, \$12.00
Fifth Wheels. — Derby and Cincinnati. 7 gross, \$12.00

Knives.
Nicholson Files, Rasps, &c. 7 gross, \$12.00
Nicholson (X. F.) Files. 7 gross, \$12.00
Nichols' n's Royal Files (Seconds) 75 (extra prices on certain sizes). 7 gross, \$12.00
Other makers, best brands. 7 gross, \$12.00
Fair brands. 7 gross, \$12.00
Second quality. 7 gross, \$12.00
Heller's Horse Rasps. 7 gross, \$12.00
McClaffey's Horse Rasps. 7 gross, \$12.00

Knives.
J. & Riley Carr. 7 gross, \$12.00
J. & Riley Carr Horse Rasps. 7 gross, \$12.00
Moss & Gamble. 7 gross, \$12.00
Butcher. 7 gross, \$12.00
Stubs. 7 gross, \$12.00
Turton's. 7 gross, \$12.00
Reaver Horse Rasps. 7 gross, \$12.00

File ing Machines.
Knob. 4 1/2 inch Roll. 7 gross, \$12.00
Knob. 6 inch Roll. 7 gross, \$12.00
Eagle. 3 1/2 inch Roll. 7 gross, \$12.00
Eagle. 4 1/2 inch Roll. 7 gross, \$12.00
Crown. 4 1/2 in. \$2.50; 6 in. \$4.00; 8 in. \$5.50 each, dis 25
Crown Jewel. 7 gross, \$12.00
American. 5 in. \$3; 6 in. \$3.50; 7 in. \$4.50 each, dis 25
Domestic Fluter. 7 gross, \$12.00
General & Fluter. White Metal. 7 gross, \$12.00
Crown Hand Fluter, No. 1. \$15; 2, \$12.50; 3, \$10.50
Shepard Hand Fluter, No. 35. 7 gross, \$12.00
Shepard Hand Fluter, No. 110. 7 gross, \$12.00
Shepard Hand Fluter, No. 96. 7 gross, \$12.00
Clare's Hand Fluter. 7 gross, \$12.00
Combined Fluter and Rad Iron. 7 gross, \$12.00
Buffalo. 7 gross, \$12.00
Fluting Scales. 7 gross, \$12.00

Fly Traps.
Parson. 7 gross, \$12.00
Kedder Squeezers. 7 gross, \$12.00
Blair's. 7 gross, \$12.00
Blair's "Climax". 7 gross, \$12.00
Fork. — Hay, Manure, &c. Asso. list. 7 gross, \$12.00
Hay, Manure, &c. Phila. list. 7 gross, \$12.00
Plated, see Spoons.

Freezers, Ice Cream.
Buffalo Champion. 7 gross, \$12.00
Shepard's Lightning. 7 gross, \$12.00
White Mountain. 7 gross, \$12.00

Fruit and Jelly Presses.
Enterprise Mfg. Co. 7 gross, \$12.00
Henis. 7 gross, \$12.00
P. D. & Co. 7 gross, \$12.00
Shepard's Queen City. 7 gross, \$12.00

Fry Pans.
High List. 7 gross, \$12.00
No. 1. 7 gross, \$12.00
No. 2. 7 gross, \$12.00
No. 3. 7 gross, \$12.00
No. 4. 7 gross, \$12.00
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No. 68. 7 gross, \$12.00
No. 69. 7 gross, \$12.00
No. 70. 7 gross, \$12.00
No. 71. 7 gross, \$12.00
No. 72. 7 gross, \$12.00
No. 73. 7 gross, \$12.00
No. 74. 7 gross, \$12.00
No. 75. 7 gross, \$12.00
No. 76. 7 gross, \$12.00
No. 77. 7 gross, \$12.00
No. 78. 7 gross, \$12.00
No. 79. 7 gross, \$12.00
No. 80. 7 gross, \$12.00
No. 81. 7 gross, \$12.00
No. 82. 7 gross, \$12.00
No. 83. 7 gross, \$12.00
No. 84. 7 gross, \$12.00
No. 85. 7 gross, \$12.00
No. 86. 7 gross, \$12.00
No. 87. 7 gross, \$12.00
No. 88. 7 gross, \$12.00
No. 89. 7 gross, \$12.00
No. 90. 7 gross, \$12.00
No. 91. 7 gross, \$12.00
No. 92. 7 gross, \$12.00
No. 93. 7 gross, \$12.00
No. 94. 7 gross, \$12.00
No. 95. 7 gross, \$12.00
No. 96. 7 gross, \$12.00
No. 97. 7 gross, \$12.00
No. 98. 7 gross, \$12.00
No. 99. 7 gross, \$12.00
No. 100. 7 gross, \$12.00

Milmax Steel Anti-Friction.....dis 50 3/4
 Zenith for Wood Track.....dis 50 3/4
 Zenith's Steel Arm.....dis 50 3/4
 Challenge, Harn. Dror.....dis 50 3/4
 Sterling Improved (Anti-Friction).....dis 50 3/4
 Victor, No. 1, \$15; No. 2, \$16.50; No. 3, \$18.....dis 50 3/4
 Cheritree.....dis 50 3/4
 Kidder's.....dis 50 3/4
 Best Anti-Friction.....dis 50 3/4
 Duplex (Wood Track).....dis 50 3/4
 Terry's Patent..... 1/2 doz. Dr. 4 in. \$10; 5 in., \$15.....dis 50 3/4
 Cronk's Patent.....No. 4, \$13; No. 5, \$14.40; No. 6, \$15.....dis 50 3/4
 Wood Track Iron Clad..... 1/2 ft. 104, dis 50 3/4
 Water's Steel Anti-Friction.....dis 50 3/4
 Architect..... 1/2 set \$6.00, dis 20 1/2
 Solipse.....dis 20 1/2
 Felix..... 1/2 set \$4.50, dis 20 1/2
 Richards.....dis 30 3/4
 Lane's Steel Anti-Friction.....dis 40 1/2
 The Ball Bearing Door Hanger.....dis 20 1/2
 Water's Steel Anti-Friction.....dis 20 1/2
 Stearns' Anti-Friction.....dis 20 1/2
 Stearns' Challenge.....dis 25 1/2
 Faultless.....dis 40 1/2
 American..... 1/2 set \$3, dis 20 1/2
 Rider & Wooster, No. 1, 33 1/4; No. 2, 75 1/2.....dis 40 1/2
 Paragon, Nos. 1, 2 and 3.....dis 40 1/2
 Paragon, Nos. 5, 5 1/2, 7 and 8.....dis 40 1/2
 Carter.....dis 50 3/4
 Nickel Cast Iron.....dis 50 3/4
 Nickel, Malleable Iron and Steel.....dis 40 1/2
 Scranton Anti-Friction Single Strap.....dis 33 1/4
 Scranton Anti-Friction Double Strap.....dis 40 1/2
 Wild West Anti-Friction.....dis 40 1/2
 Wild West, 4 in. wheel, \$15; 5 in. wheel, \$21.....dis 40 1/2
 Universal.....dis 4 1/2
 May.....dis 50 3/4
 Harness Snaps.—See Snaps.
 Hatchets.—List Jan. 1, 1895.....dis 35 1/2
 Isalah Blood.....dis 35 1/2
 Hunt's Shingling Lath and Claw.....dis 40 1/2
 Hunt's Broad.....dis 40 1/2
 Hunt's Hammer Co.....dis 40 1/2
 Fayette's.....dis 40 1/2
 Fayette's R. Plumb.....dis 40 1/2
 Wm. Mann, Jr., & Co.....dis 50 3/4
 Underhill Edge Tool Co.....dis 40 1/2
 Underhill's Haines and Bright goods.....dis 33 1/4
 C. Hammond & Son.....dis 40 1/2
 Stearns.....dis 40 1/2
 Peck's.....dis 40 1/2
 Kelly's.....dis 50 3/4
 Sargent & Co.....dis 50 3/4
 Ten Eyck Edge Tool Co.....dis 40 1/2
 Collins, following list.....dis 10 1/2
 Shingling, Nos. 1, 2, 3..... 1/2 doz \$5.50 \$6.00 \$6.50
 Claw, No. 1, 2, 3..... 1/2 doz \$4.00 \$5.00 7.00
 Lathing, Nos. 1, 2, 3..... 1/2 doz \$4.50 \$5.00 6.00
 Hay Knives.....dis 50 3/4
 Lightings.....Mfrs. price 1/2 doz \$15, dis 25 1/2
 Electric..... 1/2 doz \$17, dis 30 1/2
 Gem.....dis 30 1/2
 Wadsworth's.....dis 40 1/2
 Smith's Needle.....dis 40 1/2
 Smith's.....dis 40 1/2
 Hinges—
 Wrought Iron Hinges—
 Strap and T.....dis 70 1/2
 Screw Hook and Strap..... 6 to 12 in. 1/2 doz \$3 3/4
 14 to 20 in. 1/2 doz \$4 3/4
 22 to 36 in. 1/2 doz \$5 3/4
 Heavy Welded Hook..... 6 to 12 in. 1/2 doz \$3 3/4
 14 to 20 in. 1/2 doz \$4 3/4
 22 to 36 in. 1/2 doz \$5 3/4
 Screw Hook and Eye..... 1/2 in. 1/2 doz \$1.50
 1 1/2 in. 1/2 doz \$2.45
 2 in. 1/2 doz \$3.80
 Rolled Blind Hinges. Nos. 32 and 34.....dis 50 1/2
 Rolled Blind Hinges, Nos. 233 and 234.....dis 50 1/2
 Rolled Raised.....dis 70 1/2
 Plate Hinges, 3, 10 and 12 in. 1/2 doz \$1.50
 "Providence" over 12 in. 1/2 doz \$1.50
 Spring Hinges—
 Gear's Spring and Blank Butts.....dis 40 1/2
 Union Spring Hinge Co.'s list, March, 1895.....dis 20 1/2
 Acme and U. S.....dis 30 1/2
 Beller and Crown.....dis 30 1/2
 Hero and Monarch.....dis 50 3/4
 American, Gem, and Star, Japanized.....dis 20 1/2
 American, Gem, and Star, Bressed.....dis 20 1/2
 Oxford, Bronze and Brass.....dis 20 1/2
 Barker's Double Acting.....dis 20 1/2
 Union Mfg. Co.....dis 20 1/2
 Buckman's.....dis 30 1/2
 Chicago.....dis 30 1/2
 Gate Hinges—
 Western..... 1/2 doz \$4.40, dis 55 1/2
 N. E..... 1/2 doz \$7.00, dis 55 1/2
 N. E. Reversible..... 1/2 doz \$5.20, dis 55 1/2
 Clark's, Nos. 1 & 2.....dis 50 1/2
 Automatic..... 1/2 doz \$12.50, dis 50 1/2
 Common Sense..... 1/2 doz pair \$4.50, dis 50 1/2
 Seymour's.....dis 45 1/2
 Shepard's.....dis 60 1/2
 Reed's Latch and Hinges..... 1/2 doz sets \$12, dis 50 1/2
 Steel Hinges—
 Palmer.....dis 75 1/2
 Seymour.....dis 70 1/2
 Nicholson.....dis 55 1/2
 Huffer.....dis 50 1/2
 Clark's, Nos. 1, 2, 3, 4 and 50.....dis 75 1/2
 Clark's Mortise Gravity.....dis 50 1/2
 Sargent's, Nos. 1, 2, 3, 5, 11, 13.....dis 75 1/2
 Sargent's, No. 12.....dis 75 1/2
 Reading's Gravity.....dis 75 1/2
 Shepard's Noiseless Milgraa Buffalo, Champion, Steamboat, Clark's Old Pattern and Clark's Tip Pattern.....dis 75 1/2
 Shepard's O. S. Lull & Porter.....dis 75 1/2
 Shepard's Acme, Lull & Porter.....dis 75 1/2
 Shepard's Queen City Reversible.....dis 75 1/2
 Clark's Lull & Porter, Nos. 9, 1, 1 1/2, & 2 1/2.....dis 75 1/2
 North's Automatic Blind Fixtures, No. 2, for Wood, \$16.50; No. 3, for Brick, \$13.50.....dis 25 1/2
 Keys—
 Sledge—
 Green, Mortar, &c.....dis 55 1/2
 Planter's, Cotton, &c.....dis 55 1/2
 Warren Bee.....dis 50 1/2
 Magic..... 1/2 doz \$4.75
 D. & H. Seovil.....dis 20 1/2
 Lane's Present Seovil Pattern.....dis 45 1/2
 Lane's Crescent Pattern.....dis 45 1/2
 Lane's Razor Blade, Seovil Pattern.....dis 45 1/2
 Maynard.....dis 50 1/2
 Sandusky Tool Co., " ".....dis 50 1/2
 Hubbard & Co., " ".....dis 50 1/2
 Bare " ".....dis 50 1/2
 Grab, " ".....dis 50 1/2
 Key Rings and Hangers.....dis 50 1/2
 Mill's Improved Rings..... 1/2 doz \$4.50
 Mill's Old Style Rings..... 1/2 doz \$4.00
 Mill's Tongs.....dis 45 1/2
 Mill's Rings..... 1/2 doz boxes, \$2.25 & 2.50

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L. L. L.
Melting, Sargent's.....
Melting, Monroe, Patent.....
Melting, P. & W.....
Melting, Warner's.....
Lawn Mowers.
Standard List.....
Enterprise.....
Lanterns.
Tubular, Plain with Guards.....
Tubular, Lift Wire, with Guards.....
Tubular, Square, Plain, with Guards.....
Tubular, S. Lift Wire with Guards.....
Without Guards, 25¢ & dozen less.
Police, small, \$5.00; Med. \$7.25; Large, \$9.75.
Lemon Squeezers.
Percolator Lined, No. 1.....
Wood, No. 2.....
Wood, Common.....
Juniata's Improved.....
Juniata's, No. 1, 35¢; 2, 50¢; 12, \$1.15.....
Juniata's "Star".....
Juniata's "Boss".....
Little Giant.....
King.....
Lines.
Jotton and Linen Fish, Draper's.....
Draper's Chalk.....
Draper's Mason's Linen, 24 ft. No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25.....
Jotton Chalk.....
Samson, Cotton, No. 1, 35¢; No. 2, 45¢; No. 3, 55¢
Silver Lake, Braided, No. 0, 95¢; No. 1, 95¢; No. 2, 95¢; No. 3, 95¢; No. 4, 95¢; No. 5, 95¢
Wares' Colored Cotton.....
Wares' Colored Cotton.....
Vestibular Cord, Samson Braided, White or Drab
Cotton.....
Locks, Padlocks, Cabinet Locks, &c.
Door Locks, Latches, &c.—
List, Dec. 30, '86, chd Feb. 2, '87.....
Note.—Lower net prices often made.
Mallory, Wheeler Co., list, July, 1883.....
Sargent & Co. (list Aug. 1, 1884).....
Reading Hardware Co. (list Feb. 2, 1885).....
Livingston & Co.....
Perkins' Burglar Proof.....
Pine.....
F. Many's "Extension Cylinder".....
Barnes Mfg. Co.....
Yale Corrugated Key.....
Diets Flat Key.....
L. & C. Round Key Latches.....
Barnes' Flat Key Latches.....
Barnes' Night Latches.....
Yale new list.....
"Rhephardson" or "U. S.".....
"Felter" or "American".....
Seed's N. Y. Hasp Lock.....
Cabinets—
Eagle, Gaylord Parker and } List March, '86, revised
Corbin..... Jan. 1, '86, dis \$3.42 1/2
Diets, Nos. 36 to 39.....
Diets, Nos. 31 to 33.....
Diets, Nos. 36 to 38.....
Diets, Nos. 36 to 38.....
"Champion" Night Latches.....
Barnes Mfg. Co.....
Eagle and Corbin Trunk.....
"Champion" Cabinet and Combination.....
Yale.....
Barnes'.....
Padlocks—
List, Dec. 33, '84.....
Yale Lock Mfg. Co. s.....
Eagle.....
Eureka, Eagle Lock Co.....
Barnes' Nos. 0 to 91.....
Barnes' Scandinavian, &c., Nos. 100 to 400.....
A. E. Diets.....
"Champion" Padlocks.....
Hotchkiss.....
"Star".....
"Horse Shoe".....
Barnes Mfg. Co.....
Barnes' Patent.....
No. 1.....
Brown's Patent.....
Scandinavian.....
Fram's Pat. Scandinavian new list (new).....
Lumber Tools.
Ring Peavies, "Blue Line" Finish.....
Ring Peavies, Common Finish.....
Steel Socket Peavies.....
Wall Iron Socket Peavies.....
Jant Hooks, "Blue Line" Finish.....
Jant Hooks, Common Finish.....
Jant Hooks, Mall. Socket Clasp, "Blue Line" Finish.....
Jant Hooks, Mall. Socket Clasp Common Finish.....
Jant Hooks, Clip Clasp, "Blue Line" Fin.....
Jant Hooks, Clip Clasp, Common Finish.....
Band Spikes.....
Pike Poles, Pike & Hook.....
Pike Poles, Pike only.....
Pike Poles, not ironed.....
Setting Poles.....
Wamp Hook.....
Lodge Block.....
Skidding Tongs.....
Log Binders.....
Sanded Bolt Calks, 1 to 5 M, dis 25¢; 5 to 10 M, dis 30¢
Square Steel Bolt Calks.....
Chain Rafter Dogs.....
Ring Rafter Dogs.....
Timber Grapples.....
Lustrs.
Four-ounce Bottles.....
Mallets.
Hickory.....
Lignumvits.....
B. & L. Block Co., Hickory and L. V.....
Match Safes.
Dangerefield's Self-Igniting.....
Matecocks.—Regular list.....
Meat Cutters.
Dixons'—Nos. 1 2 3 4
Woodruff's.....
Champion.....
Hales' Pattern No. 11 12 13
American.....
Enterprise.....

Cable Laid Italian "	¢ 22 1/2 @ 32 1/2
Cable Laid " "	¢ 13 1/2 @ 18 1/2
Silver Lake, A Quality, White.....	50¢ dis 10 1/2 @ 10 1/2	
Silver Lake, A Quality, Drab.....	50¢ dis 10 1/2 @ 10 1/2	
Silver Lake, B Quality, White.....	50¢ dis 10 1/2 @ 10 1/2	
Silver Lake, B Quality, Drab.....	50¢ dis 10 1/2 @ 10 1/2	
Silver Lake, C Quality, White only.....	37 1/2 @ 34 1/2	
Silver Lake, C Quality, Drab only.....	37 1/2 @ 34 1/2	
Silver Spring, Extra Braided, Drab.....	.....
Semper Idem Braided, White.....	.....
Egyptian, India Hemp, Braided.....	.....
Samson, Braided, White Cotton.....	50¢ dis 30 @ 30 1/2	
Samson, Braided, Drab Cotton.....	50¢ dis 30 @ 30 1/2	
Samson, Braided Italian Hemp.....	50¢ dis 30 @ 30 1/2	
Samson Braided Linen.....	80¢ dis 30 @ 30 1/2	
Sash Locks.		
Clark's No. 1, \$10.00; No. 2, \$3.00 ¢ gross.....	dis 33 1/2	
Ferguson's.....	dis 33 1/2	
Morris and Triumph, list Aug. 16, 1896.....	dis 60 1/2	
Victor.....	60 1/2 @ 10 1/2	
Walker.....	dis 10 1/2	
Wells Mfg. Co.....	dis 25 @ 25 1/2	
Reading.....	dis 65 1/2 @ 10 1/2 @ 60 1/2 @ 10 1/2	
Hammond's Window Springs.....	dis 40	
Common Sense, Jap d. Cop'd and Br'nd.....	¢ gross 34 1/2	
Common Sense, Nickel Plated.....	dis 30 1/2	
Universal.....	dis 60 1/2	
Remphall's, Gaitty.....	dis 60 1/2	
Remphall's Model.....	dis 60 @ 60 1/2	
Corbin's Daisy, list February 15, 1896.....	dis 70 1/2	
Payson's Perfect.....	dis 60 @ 60 1/2	
Huganin's New and Improved Adjustable Sash Bars.....	dis 30 1/2	
anoe, list Jan. 5, 1897.....	dis 30 1/2	
Huganin's Window Locks, list Jan. 5, '97 dis 25 1/2 @ 25 1/2	dis 10 1/2	
Patent "Fractional".....	dis 10 1/2	
Ives Patent.....	dis 30 1/2	
Liesche's Nos. 100 & 110. ¢ gro. 35. 105. 110. dis 30 1/2 @ 10 1/2	dis 40 1/2	
Davis, Bronze, Barnes Mfg. Co.....	dis 40 1/2	
Champion Safety, list March 1, 1898.....	dis 55 @ 55 1/2	
Security.....	dis 70 1/2	
Sash Weights.		
Solid Eyes.....	¢ ton 33 1/2	
Sausage Stuffers or Fillers.		
Miles' "Challenge".....	¢ doz 30, dis 50 @ 50 1/2	
Perry.....	¢ doz. No. 1, 25 ¢ No. 2, 31, dis 50 @ 50 1/2	
Draw Out No. 4.....	each, 30, 00, dis 40 1/2	
Enterprise Mfg. Co.....	dis 40 1/2	
Edvers.....	dis 40 1/2	
Saws.		
Diston's Circular.....	dis 45 @ 45 1/2 ¢	
Atkins's Cross Cut, dis 45 @ 45 1/2 ¢	dis 45 1/2	
Atkins's Circular.....	dis 25 @ 25 1/2 ¢	
Atkins' Silver Steel Diamond X Cuts.....	¢ foot 70	
Atkins' Special Steel Dexter X Cuts.....	¢ foot 50 1/2	
Atkins' Special Steel Diamond X Cuts.....	¢ foot 30 1/2	
Atkins' Champion and Electric Tooth X Cuts.....	¢ foot 27 @ 28 1/2	
Atkins' Holio-Bit X Cuts.....	¢ foot 15 1/2	
Atkins' Shingle, Mulay, Drag, &c.....	dis 45 1/2	
W. M. & C., Hand.....	dis 50 1/2 @ 50 1/2 ¢	
W. M. & C. Champion X Cuts, Regular ¢ foot 24 @ 24 1/2	dis 24 @ 24 1/2	
W. M. & C. X Cuts, Thin Back.....	¢ foot 27 @ 27 1/2	
Peace Circular and Mill.....	dis 20 1/2 @ 20 1/2 ¢	
Peace Hand Panel and Rip.....	dis 20 1/2 @ 20 1/2 ¢	
Peace Cross Cut, Standard.....	¢ foot 25 1/2	
Peace Cross Cut, Thin Back.....	¢ foot 27 @ 27 1/2	
Richardson's Circular and Mill.....	dis 45 @ 45 1/2 ¢	
Richardson's X-Cuts, No. 1, 30¢; No. 2, 37¢; No. 3, 24¢	dis 45 1/2	
Hack Saws.		
Grinn's Hack Saws, complete.....	dis 40 1/2 @ 50 1/2	
G. H. Hack Saw, blades only.....	dis 40 1/2 @ 50 1/2	
Star Hack Saws and Blades.....	dis 25 ¢	
Diamond Hack Saws and Blades.....	dis 25 ¢	
Eureka and Crescent.....	dis 25 ¢	
Saw Frames.		
White Vermont.....	¢ gre 39 @ 40 1/2	
Red, Polished, and Varnished.....	¢ doz \$1.50, dis 25 ¢	
Saw Sets.		
Stillman's Genuine.....	¢ doz \$5.00 and \$7.75, dis 40 1/2	
Stillman's Genuine, ¢ doz \$5.50 and \$8.25, dis 40 1/2 @ 40 1/2	dis 40 1/2	
Common Lever.....	¢ doz \$3.00, dis 40 1/2	
Morrill's No. 1, \$15.00; Nos. 3 & 4, \$34.....	dis 40 1/2 @ 50 1/2	
Leach's.....	No. 0, \$3.00; No. 1, \$15.00, dis 15 @ 20	
Nash's.....	dis 20 1/2 @ 20 1/2 ¢	
Hammer, Hotchkiss.....	dis 30 1/2	
Hammer, Best Nail Co.'s Lever and Spring Hammer, dis 30 1/2	dis 30 1/2	
Bemis & Call Co.'s Plate.....	dis 10	
Bemis & Call Co.'s Cross Out.....	dis 19 1/2	
Alken's Genuine.....	dis 60 1/2	
Alken's Imitation.....	77 ¢, dis 60 1/2	
Hart's Patent Lever.....	dis 20 1/2	
Diston's Star, 25.....	per doz No. 1, \$4.00 @ 20 1/2 @ 10 1/2	
Hutkins' Lever.....	per doz No. 1, \$4.00, No. 2, \$3.00	
Atkins' Criterion.....	per doz \$7.50	
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00.....	dis 40 1/2	
Saw Tests.		
Atkins Perfection.....	\$15.00; Excelsior \$4.00 ¢ doz	
Scales.		
Hatch, Counter, No. 171, good quality.....	¢ doz 33 1/2	
Union Tea, No. 161.....	¢ doz \$2.75 @ \$7.00	
Union Platform, Plain.....	dis 30 1/2 @ 30 1/2	
Union Platform, Striped.....	dis 30 1/2 @ 30 1/2	
Chattillon's Grocers' Trip Scales.....	dis 50	
Chattillon's Eureka.....	dis 40	
Chattillon's Favorite.....	dis 40	
Family, Turnbull's.....	dis 70 @ 30 1/2	
Scale Beams.		
Scale Beams, list of Jan. 13, 34, dis 50 1/2 @ 50 1/2 @ 10 1/2	dis 40 1/2	
Chattillon's No. 1.....	dis 40 1/2	
Chattillon's No. 2.....	dis 40 1/2	
Scraper.		
Adjustable Box Scraper (S. B. & L. Co.) \$6.50, dis 30 1/2	dis 30 1/2	
Box, 1 Handle.....	¢ doz \$4.00, dis 10	
Box, 2 Handles.....	¢ doz \$4.00, dis 10	
Performance Box and Ship.....	dis 20 1/2	
Foot.....	dis 50 1/2 @ 60 1/2	
Ship, Common.....	¢ doz \$3.50, dis 10	
Ship, Providence Tool Co.....	dis 10	
Screen Window and Door Frames.		
Porter's Pat. Window and Door Frame.....	dis 33 1/2 @ 34 1/2	
Screen Corner Irons, Warner's.....	dis 33 1/2 @ 33 1/2 @ 10 1/2	
Stearns' Frames and Corners.....	dis 25 @ 25 1/2	
Screw Drivers.		
Douglas Mfg Co.....	dis 20 1/2 @ 10 1/2	
Diston's.....	dis 45 1/2	
Diston's Patent Excelsior.....	dis 10	
Stacy Bros.....	dis 30	
Buck & L. Co.'s Varnished Handles.....	dis 65 1/2	
Staniek & L. Co.'s Black Handles.....	dis 60 1/2	
Sargent & Co.'s No. 1 Forged Handle.....	dis 60 @ 10 1/2	
Sargent & Co.'s Nos. 20, 10 and 60.....	dis 65 1/2 @ 10 1/2	
Knapp & Cowles' No. 1.....	dis 60 1/2 @ 10 1/2	
Knapp & Cowles' No. 1 Extra.....	dis 60 1/2 @ 60 1/2	
Knapp & Cowles' No. 00 & 0.....	dis 25 1/2 @ 10 1/2	
GAY & Parsons.....	dis 35	
(hampton).....	dis 25 1/2	
Clark's Patent.....	dis 30 @ 33 1/2	
Crawford's Adjustable.....	dis 25 @ 25 1/2	
Ellrich's Socket andatchet.....	dis 25 @ 25 1/2	
Allard's Spiral, new list.....	dis 25 @ 25 1/2	
Kolb's Common Sense.....	¢ doz 30, dis 25 1/2	

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CURRENT METAL PRICES.

OCTOBER 3, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.	
Bar Iron from Store.	
Common Iron:	
1 to 2 in. round and square.	1.90 @ 2.00¢
1 to 6 in. x 1/2 to 1 in.	
Refined Iron:	
1 to 2 in. round and square.	2.10 @ 2.2¢
1 to 4 in. x 1/2 to 1 1/2 in.	
4 1/2 to 6 in. x 3/4 to 1 in.	
1 to 6 in. x 1/2 and 5-16.	2.30 @ 2.4¢
Rods—5/8 and 1-1/8 round and sq.	2.20 @ 2.3¢
Bands—1 to 6 x 3-16 to No. 12.	2.30 @ 2.4¢
"Burden Best" Iron, base price.	3.00 @
Burden's "H. B. & S." Iron, base price.	2.80 @
"Uster."	3.10 @
Norway Rods.	4.00 @ 5.00¢
Merchant Steel from Store.	
Open-Hearth and Bessemer Machinery.	
Toe Calk, Tire and Sleigh Shoe, base price in small lots.	3 1/2¢ @ 3¢
Best Cast Steel, base price in small lots.	8 1/2¢ @ 9¢
Best Cast Steel Machinery, base price in small lots.	5 1/2¢ @ 6¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.	
Common American.	R. G. Cleaned.
10 to 16.	2.75 @ 2.80¢
17 to 20.	2.85 @ 3.00¢
21 to 24.	3.00 @ 3.10¢
25 and 26.	3.20 @ 3.50¢
27.	3.85 @ 3.75¢
28.	4.00 @ 4.00¢
B. R.	
Galv'd, 14 to 20.	4.50 @ 4.38¢
Galv'd, 1 to 24.	4.87 1/2 @ 4.75¢
Galv'd, 25 to 28.	5.25 @ 5.12¢
Galv'd, 27.	5.62 1/2 @ 5.48¢
Galv'd, 28.	6.00 @ 5.85¢
Patent Planished.	10¢ @ 10¢
Russia.	9 1/2¢ @ 10¢
American Cold Rolled B. B.	5¢ @ 7¢

English Steel from Store.	
Best Cast.	15¢
Extra Cast.	16 1/2¢
Swaged, Cast.	16¢
Best Double Shear.	15¢
Blister, 1st quality.	12 1/2¢
German Steel, Best.	10¢
3d quality.	9¢
3d quality.	8¢
Sheet Cast Steel, 1st quality.	15¢
2d quality.	14¢
3d quality.	12 1/2¢

METALS.	
Tin.	
Banca, Pigs.	25¢
Straits, Pigs.	25¢
English, Pigs.	24 1/2¢
Straits in Bars.	20¢

Tin Plates.—Bright.	
Charcoal Plates.—Bright.	Per box.
Melyn Grade.	
IC, 10 x 14.	\$6.00 @ \$6.25
IC, 12 x 18.	6.25 @ 6.50
IC, 14 x 20.	6.00 @ 6.25
IC, 20 x 28.	12.50 @ 13.00
IX, 10 x 14.	7.50 @ 7.75
IX, 12 x 12.	7.75 @ 8.00
IX, 14 x 20.	7.50 @ 7.75
IX, 20 x 28.	15.50 @ 16.00
DC, 12 1/2 x 17.	5.75 @ 6.00
DX, 12 1/2 x 17.	7.25 @ 7.50
Call and Grade.	
IC, 10 x 14.	6.00 @ 6.25
IC, 12 x 18.	6.25 @ 6.50
IC, 14 x 20.	6.00 @ 6.25
IX, 10 x 14.	7.50 @ 7.75
IX, 12 x 12.	7.75 @ 8.00
IX, 14 x 20.	7.50 @ 7.75
IX, 20 x 28.	15.50 @ 16.00
DC, 12 1/2 x 17.	5.75 @ 6.00
DX, 12 1/2 x 17.	7.25 @ 7.50
Allaway Grade.	
IC, 10 x 14.	\$5.37 1/2 @
IC, 12 x 18.	5.50 @
IC, 14 x 20.	5.87 1/2 @
IC, 20 x 28.	11.50 @
IX, 10 x 14.	6.25 @
IX, 12 x 12.	6.50 @
IX, 14 x 20.	6.25 @
IX, 20 x 28.	18.00 @
DC, 12 1/2 x 17.	.00 @
DX, 12 1/2 x 17.	6.00 @

Coke Plates.—Bright.	
Steel Coke.—IC, 10 x 14, 14 x 20.	\$5.00 @
10 x 20.	7.50 @ 7.65
20 x 28.	10.25 @
IX, 10 x 14, 14 x 20.	5.75 @
BV Grade.—IC, 10 x 14, 14 x 20.	4.70 @
Charcoal Plates.—Terne.	
Dean Grade.—IC, 14 x 20.	\$4.62 1/2 @
20 x 28.	9.25 @
IX, 14 x 20.	5.62 1/2 @
20 x 28.	11.87 1/2 @
Abecarne Grade.—IC, 14 x 20.	4.50 @
20 x 28.	9.00 @
IX, 14 x 20.	5.50 @
20 x 28.	10.80 @

Tin Boiler Plates.	
IX, 14 x 20.	112 sheets @ \$12.50 @ \$12.75
IX, 14 x 28.	112 sheets @ 12.75 @
IX, 14 x 31.	112 sheets @ 14.25 @

Copper.	
Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢	
1/2 lb. Manufactured (including all articles of which Copper is a component of chief value), 4¢ ad valorem.	
Ingot.	
Lake.	@ 18 1/2¢
"Anchor" Brand.	@ 18¢

Sheet and Bolt.	
Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.	
than	than
Not wider	Not longer
than	And longer
than	than
Over 64 oz.	Over 64 oz.
30—72.	25
30—72.	25
36—96.	25
36—96.	25
48—96.	25
48—96.	25
60—96.	25
60—96.	25
84—96.	25
84—96.	25
Over 64 in. wide.	28

All Bath Tub Sheets.....	16 oz.	14 oz.	12 oz.	10 oz.
Per pound.....	\$0.25	0.30	0.32	0.35
Bolt Copper, $\frac{3}{8}$ inch diameter and over, per pound.....	25¢			
Circles, 60 inches in diameter and less, 8 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Segment and Pattern Sheets, 8 cents per pound advance over price of sheets required to cut them from.				
Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.				
Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.				
Bottoms, Ribs and Flange				

THE IRON AGE

THURSDAY, OCTOBER 11, 1888.

New Emery Grinders.

We illustrate on this page two new emery grinders built by the Norton Emery Wheel Company, of Worcester, Mass., the nature of the design being well shown and requiring little description. The machines

heavy, and this point has not been forgotten. Fig. 1 represents a 2-inch grinder, the distance between the wheels being 40 inches and the entire length of spindle 55 inches. The bearings are 12 inches long and the height from floor to the center of the spindle is 29½ inches. The spindle, for

ing countershaft, is only 180 pounds. Both machines will work equally well wet or dry.

Experiments in submarine telephony have been made by the French Government at Brest. The instrument is called a hydro-

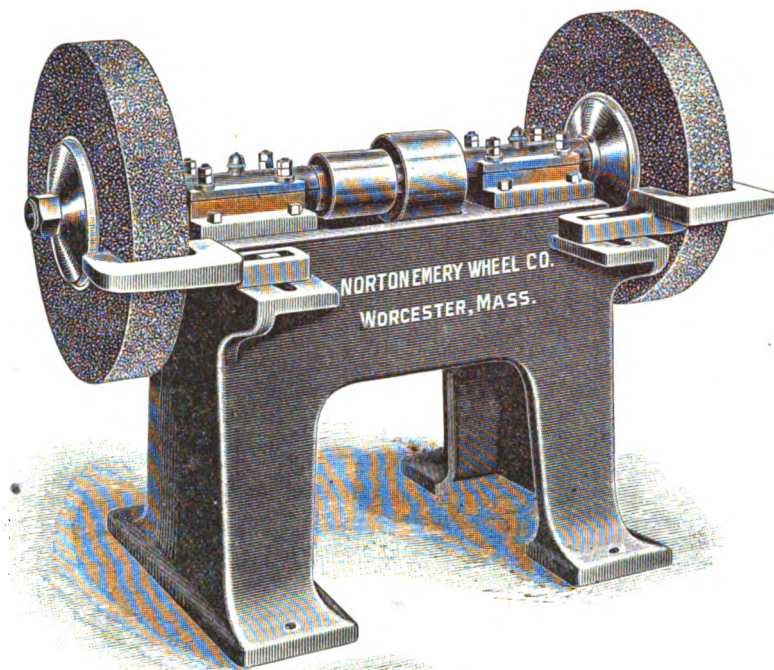


Fig. 1.—Two-Inch Standard Grinder.

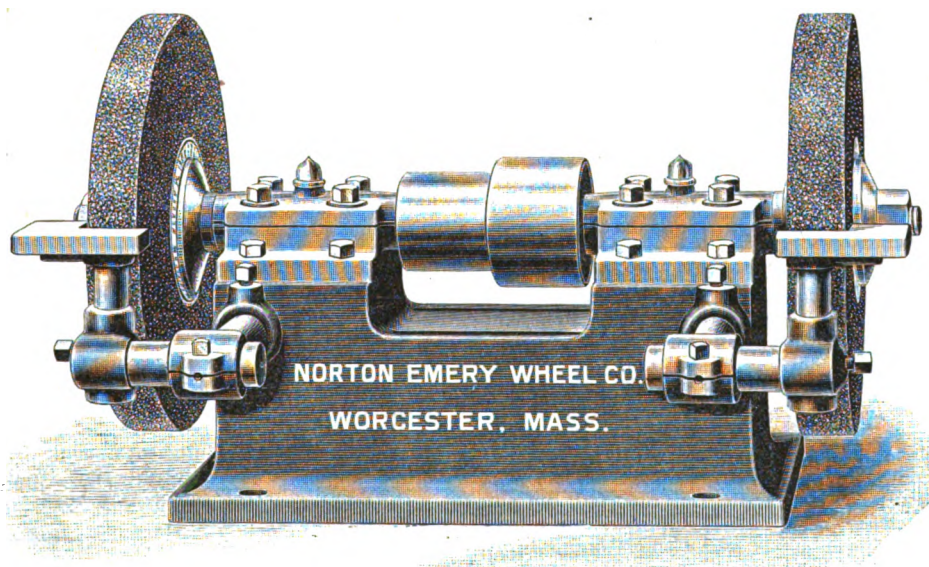


Fig. 2.—One-Inch Bench Grinder.

NEW EMERY GRINDING MACHINERY, BUILT BY THE NORTON EMERY WHEEL CO., WORCESTER, MASS.

are furnished with self-oiling boxes, which keep the bearings supplied with oil for a long time without refilling, and they are so arranged as to prevent dust from entering the journals. It will be noticed that the bearings are of extra length and that unusual distance is given between wheels. It is a well-known fact that the machinery for this purpose should be strong, firm and

slow speed, runs at 925 revolutions per minute, and of quick speed, at 1350. The weight of the machine complete is 1000 pounds. Fig. 2 shows a 1-inch bench grinder running at 1600 and 2250 turns per minute for slow and quick speed work respectively. The wheels here are 21¼ inches apart and the entire length of the spindle is 29 inches. The weight, includ-

ing countershaft, is only 180 pounds. Both machines will work equally well wet or dry. Experiments in submarine telephony have been made by the French Government at Brest. The instrument is called a hydro-

Minnesota Iron Ores.—II.

BY JOHN BIRKINBINE, PHILADELPHIA, PA.

The Tower Mine.

Two hundred feet is the present working depth of part of the Tower mines, but a shaft is sunk 70 feet further, from which drifts are being run so as to keep several years' work in sight. The large open pits are still operated, but all new work is underground. The policy which General Superintendent Bacon has adopted, of keeping so far in advance of actual mining, has somewhat increased the proportion of lean ores; but even this "Red Lake" ore, yielding 62 to 65 per cent. of iron, cannot be considered lean. The "Minnesota Bessemer" ore is fully up to the high standard of excellence adopted by the company. The season's average being reported as "67 per cent. strong." The complimentary names assigned to the various openings have given place to the shorter system of numbers, for diamond drill explorations indicate that the ore lenses overlap each other, and new openings will probably soon be necessary.

A most interesting study of the peculiarities of the occurrence of red hematite ore is found in the western end of the Ely pit, where over one-half of the ore body was cut out by a nearly perpendicular face of jasper, but deeper down the ore penetrated into the horse, and at a greater depth the ore-lense apparently divides and passes on either side, between the horse and the foot and hanging walls. Viewed from the opening, this horse resembles a nearly vertical pier, standing some distance from the foot wall, carrying an arch, which extends from it to the hanging wall, the arch being nearly a true half circle, seamed so as to closely resemble stone voussoirs. The ore was followed into this arch and gradually pinched out, so that the horse stops short of presenting the appearance of a natural bridge. The almost perpendicular face of the pillar, rising from the present workings over 100 feet to the level from which the surface drift was removed, and the arch which it supports presents a most impressive picture when the miners working at its base emphasize its size. The magnificent proportions of the open quarry, which has heretofore been known as the Tower Pit, make it fully as impressive as any other of our large open iron mines.

The Chandler Mine.

The extension of the Duluth and Iron Range Railroad from Tower north-eastwardly for 21 miles to Ely, has added to the shipping mines the "Chandler," and it is expected to contribute 40,000 tons or more of ore to Minnesota's output of probably 500,000 tons of iron ore in 1888.

While the character of the ore from the Chandler mine resembles that at the Tower mines, its physical condition and occurrence are quite different. The Chandler may be described as a *gravel bank* of hard specular ore, while the Tower mines are quarries of compact masses of hard specular ore. In occurrence the ore in the Chandler mine more nearly resembles some of the Gogebic mines, but the individual pieces are hard ore. As it now appears, the Chandler mine is an open pit, from which about 20 feet of drift has been stripped, and some 20 feet of loosely agglomerated ore is being taken by inclined skip roads. Two shafts, 750 feet apart, are sunk outside of the ore body, from these drifts are run and chutes or raises are being cut to take the ore out of the open pit below the present working level. These shafts are vertical, 82 and 92 feet from the surface, respectively, fitted with cages on which the tram-cars are run. The ore

below the surface drift is very much broken and can be picked and shoveled readily. There is no close selection necessary, for the deposit is practically all clean ore. Cross cuts have shown the body to vary in width; the present workings measure at various cross cuts widths of 40 feet, 33 feet, 70 feet, and 108 feet, the latter being the widest part discovered; at the east end the indications do not promise such great width. While not comparable to the Tower mines, the Chandler is a magnificent deposit of Bessemer ore, the only drawbacks being that it is not held in fee, but is worked under a royalty of 50 cents per ton; and the broken condition of the ore which will make underground operations expensive. It is, however, the opinion of Captain Sellwood and Captain Pengilly that the ore will be harder and more compact as it is followed deeper into the earth. A full equipment of machinery is now being erected, and the owners anticipate that in 1889 the Chandler mine will rank among the large producers. The ore taken from the open workings is designated as "long lake," it carries 60 per cent. and over of iron, and is below the Bessemer limit of phosphorus; the "blue ore" at east end is claimed to average close to 67 per cent. of iron with 0.04 of phosphorus. As lake shipments have just commenced no cargo analyses are obtainable, but the following determinations which have been made will permit of liberal discount on account of selection and still indicate a superior ore.

Analyses of Ore from the Chandler Mine.

Iron.....	66.50	} Personally selected for average of deposit.
Phosphorus.....	0.053	
Silica.....	2.62	

Iron.	Phosphorus.	Silica.	
69.07	0.019	1.40	
67.76	0.036	1.40	
69.00	0.018	0.82	drill core 150 feet deep.
66.79	0.036	4.07	drill core 150 feet deep.
68.73	0.050	1.13	80 feet deep large sampling.
66.23	0.058	2.60	

All analyses are made at 212° F., but the ore carries but little water.

The Chandler mine has large stock piles ready for shipment, some of which have accumulated on account of delays in getting the extension of the railroad from Tower to Ely in operation. The road-bed, which was made during the winter, passed over a "muskeg" or peat bog. When the frost left the bog the embankment disappeared; it was filled up and again sank, until, after repeated efforts, dumping two train loads of roots and timbers and 1500 carloads of gravel into a length of 150 feet of road-bed, a secure bottom was had. On either side of the railroad track are enormous furrows, as if cut by a gigantic plow, which show how the peat has been forced up by the filling settling to a bottom.

While explorations are not so active as a year ago, there is considerable life along the iron ranges, the diamond drill as well as pick, and dynamite being utilized. Some very favorable showings are reported, but outside of the mines now shipping, no others can be mentioned without doing injustice by omissions of some which may exhibit equally good indications. In making this statement, it is well to recall the high standard of excellence which characterizes the district. There is abundance of outcroppings pointing to ore considered lean in Minnesota, which in Pennsylvania, Virginia, Alabama and Tennessee would be ranked as merchantable. The seekers have invariably made Bessemer ore the desideratum, and any deposit which fails to meet the requirements of our steel works has disappointed the explorers. The establishment of industries at the head of Lake Superior will, however, have a tendency to bring some of these less desirable ores in demand.

The blast furnace of the Duluth Iron and Steel Company is sufficiently advanced to insure it going into operation next season, and the establishment of a carworks immediately adjoining the blast furnace will offer a market for considerable foundry iron, which will be supplemented by the requirements of the two foundries in Duluth and those of St. Paul and Minneapolis.

An industry once established at Duluth will expand, and the fact of ores being comparatively lean or carrying phosphorus beyond the Bessemer limit will not condemn them. The pipeworks, for which foundations are being laid in West Superior, Wis., show the faith of those interested in the supply of cheap foundry irons. Whether this company will follow the pipeworks with a blast furnace plant or depend at first upon the iron to be supplied by the Duluth Iron and Steel Company's furnace will be a question only for the initial operation, for other industries will surely follow. The project of a stove foundry at Duluth is now under consideration by some St. Louis parties. The problem of transporting coal to the head of Lake Superior and there coking it will soon be solved by practical tests in the battery of coke ovens constructed near the docks of the Lehigh Coal Company.

We may confidently expect that Minnesota will continue to be an important source of supply for high grade Bessemer iron ores, and also furnish a considerable amount of ores suited for foundry and mill irons. As but one-third of the pig-iron product of 1887 was of Bessemer grade the opportunities for utilizing non-Bessemer ores from Minnesota are encouraging, and the probabilities are favorable for the development of some of the leaner red hematites and the exploitation of some of the magnetites. The presence of titanium in the latter has discouraged operations along the Mesabi range, but there are numerous analyses shown which exhibit little or none of this element. There is no reason to anticipate that the entire range will produce titaniferous magnetites, for in the Lake Champlain district we find titaniferous and non-titaniferous, Bessemer or non-Bessemer magnetites in deposits located close to each other.

Wages in the Pittsburgh Coal Field.

—As was announced in these columns some time since, the wages of the railroad coal miners in Pennsylvania will be advanced 5 cents per ton on November 1, increasing the mining rate to 79 cents a ton, according to the agreement made last April. It was then decided by the operators and miners in joint session that the mining rate should be 74 cents from May 1 to November 1, and from the latter date to May next 79 cents. Some of the operators who were not represented at the joint convention, it is stated, will not pay the advance, and unless an amicable arrangement is made before November 1, it is probable that trouble will ensue, as the miners say they will enforce the advance.

Mahoning Valley Coke Rates.—Some time ago the iron manufacturers and blast-furnace operators of the Mahoning Valley, Ohio, through Robert Bentley, secretary of their organization, presented a petition to the managers of the various railroads asking that the rate on coke from the Connelville region to the valley be reduced from \$1.35 per ton to \$1.25 per ton. An answer has been received, stating that at present the roads were overtaxed, cars were scarce, and they felt that they could not comply with the request. They promised not to advance the rate, and intimated that when business should slacken somewhat they might reconsider their decision.

Rolling Seamless Tubes.

A subject which more recently has attracted a good deal of attention, both in England and Germany, is the rolling of seamless tubes from solid bars or ingots by what is known as the Mannesmann process. At the late meeting of the British Association Mr. Frederick Siemens presented a paper describing it in detail, and from this we take the following, together with the engravings:

The process consists generally in a method of rolling metal into seamless tubes, and it will contribute greatly to increase the use of steel, and principally of those kinds of cheap steel produced by the methods mentioned above. The open-hearth or Siemens steel, above all, possesses the advantage of being cheap, of having the right amount of toughness, homogeneity and other qualities which fit it for the special purpose of rolling solid

pected to arise, as we now have the means of bringing into use the best of material in the lightest and at the same time strongest form.

At the present time, to roll a bar of iron, two horizontal rolls, as shown in Figs. 1 and 2, revolving in opposite directions, are used. If the section of the finished bar is required to be of any given form, grooves are cut around the rolls of the sectional form which the bar is required to assume. Passed longitudinally between the revolving rolls the bar is forced into the grooves and reappears molded to the desired form. The rolls do not make the bar revolve, they act simply on its surface drawing the material forward and forcing it into the prepared grooves, at the same time elongate it and reduce its sectional area. The fiber produced in the finished product is of course longitudinal. Tubes are also made in this way. The prepared sheet of wrought iron is bent till the sides

tube, whereas the latter actually makes the tube, and, in making it, displaces the material of the bar or ingot acted on, and imparts to it a fiber running in a spiral around it. In both systems two or three rolls may be used together, turning in the same direction, and, consequently, imparting a rotating movement in the opposite direction to a bar laid between them. The two or more rolls (Figs. 5 and 6), however, do not lie normally, nor even parallel, but at angles to the axis of each other, and the axis of these rolls cross one another and that of the bar, forming somewhere in space acute angles in opposite directions with each other, and with the bar lying between them. When thus set the rolls act on the bar to draw it forward as well as to make it revolve—or, in other words, they impart to it a spiral movement. Though constructively both systems of mills may appear much the same, they differ widely in their mode of work-

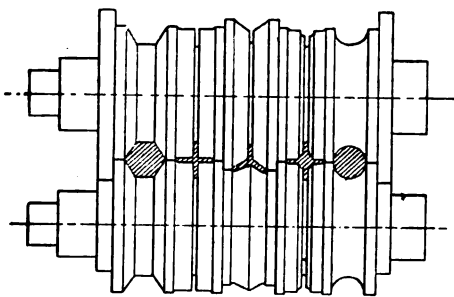


Fig. 1.

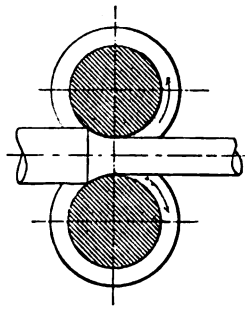


Fig. 2.

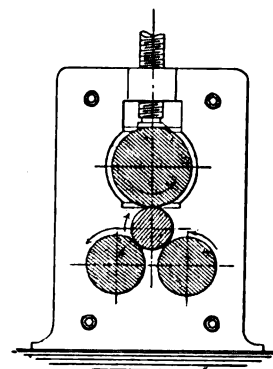


Fig. 3.

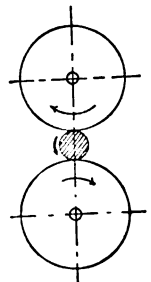


Fig. 4.

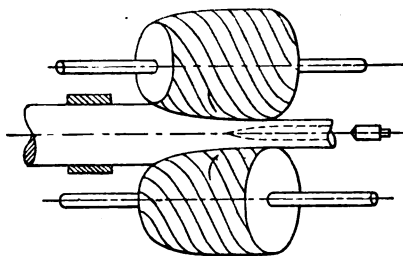


Fig. 5.

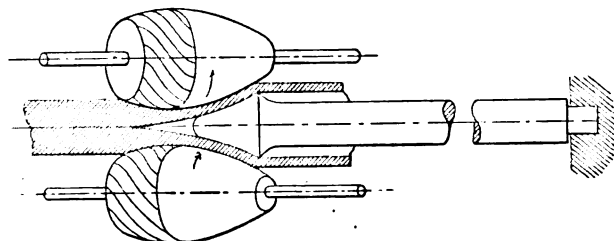


Fig. 6.

ROLLING SEAMLESS TUBES BY THE MANNESMANN PROCESS.

ingots direct into tubes. Tubes occupy an important place in the wants of mankind. Besides their use as tubes properly so-called they possess, also, the most advantageous form for columns, rods, axles, bearers, struts, &c. A given quantity of material can be formed into no shape so strong as the tubular.

Hitherto steel tubes could only be made with difficulty and at high cost by a complicated process with imperfectly welded seams and a longitudinal fiber. Now from a rough ingot of cheap steel with one, or, at the most, two operations, a perfect tube without seam and with a circular fiber is produced. It may be seen from this bare statement how great is the importance of this invention. If it is considered that by the process in question tubes of great length and diameter, and of almost any desired thickness of metal, can be produced at a comparatively low cost, airtight and possessing treble or quadruple the resisting power of the best welded tubes of wrought iron, it can hardly be doubted that a great future is opened out for their use in technical arts, industries, architecture, and also in war materials. New branches of industry may also be ex-

overlap and the longitudinal seam thus made is welded while passing through the rolls on a mandrel placed inside. The ordinary patent welded wrought-iron tubes made in this way have also a longitudinal fiber.

Another way (Figs. 3 and 4) of rolling is known and is used for straightening and polishing bars to which a rotating motion is imparted by two or three rolls revolving in the same direction. These rolls are for the most part placed parallel to one another, and the bar to be operated on is introduced in the direction of their longitudinal axis—that is, at the ends instead of at a right angle to the rolls. If such rolls the bar is not drawn forward but simply rotates, and if sufficient pressure is given the bar is elongated, but no decided fiber is produced.

Between the two kinds of rolling described above, which may for convenience be called longitudinal and circular respectively, another system of polishing and straightening bars and tubes occupies a kind of middle position. So also does the Mannesmann tube-rolling process. The systems differ, however; the first acts on the surface only of the bar or finished

ing and in their results. This arises from the position which the article acted upon and which we will continue to call a bar, is made to take up, and the very different action and form of the rolls. In the Mannesmann machine a certain relation is maintained between the forward movement of the bar and its rotating movement, and if the proportion between longitudinal and rotary motion is properly adjusted to the special material acted on, the displacement in the substance of the bar is regulated so that a systematic twist is given to the fiber, by which not only irregular breakage of the material is avoided, but an energetic working action is secured, causing the great strength and toughness the tubes produced by this process are proved to possess.

The old straightening and polishing machine, although outwardly similar to the Mannesmann tube-rolling machine, owing to the form and position of the rolls and bars, admits of no twisting and displacement of material, and, consequently, this machine confines itself to surface action as, indeed, it professes to do by its title. The following remarks may assist in clearing up this singular difference, and explain

the peculiar action of the Mannesmann roll which, while acting on the outer surface of a solid bar, produce a regular hollow space inside the same—in short, a tube. To obtain a simple forward spiral action of the bar, the length of the rolls is immaterial; it will take place when the rolls are reduced to the form of thin disks. Supposing the disks to be infinitely thin, or what is the same thing, that their outer edges are reduced to a mathematical line and no sliding motion takes place, the bar must still move forward spirally, its spiral velocity being equal to the velocity of the outer circumference of the disks. If, instead of one pair of such thin disks, several pairs of disks of regularly increasing diameters are made to revolve on the same axis, the outer circumference of each disk will revolve with greater velocity than that of the preceding one. The same bar is, however, drawn forward through the several pairs of disk, and thus as each part of the bar enters successively a more advanced pair of disks, the velocity with which that portion of the bar rotates increases, and it is drawn forward by each succeeding pair of disks as they catch hold of it with ever-increasing speed.

It will be understood that a bar passing through such a series of disks, no slipping being possible, the material of which it is composed cannot retain its original area or volume. The diameter of the bar being regulated by the disks, while simultaneously a violent stretching action is carried on, the material required can only be drawn from the inside of the bar, and thus a hollow space is formed. Instead of this peculiar arrangement of disks a conical or rather conoidal, pair of rolls, which amount to the same thing as the disks, considered as joined together, may be provided. It follows that a bar or rod of suitable dimensions which is passed through the Mannesmann rolls will, provided its substance is sufficiently homogeneous and plastic, undergo a violent twisting and stretching action, the fiber being spun as is the fiber in a rope on account of which the process may appropriately be called a torsional process. The bar in its passage through the rolls is twisted as thread is twisted in a spinning machine. As, however, it cannot be fed from the outside as is the thread, and as has been said, the diameter cannot be reduced on account of the action of the rolls, it is forced to draw on the interior for a supply of material.

I will attempt to explain in another way. The tube is made thus: A bar is placed between the conoidal rolls at the part where their diameter being least the speed at which they move to make a revolution is also least. The rolls seize the bar and draw it into contact with parts of the cones which move more and more rapidly, though, owing to the way in which the rolls are set, the space left between them for the passage of the bar decreases slightly. Slight, however, as is this decrease in the space between the rolls a certain amount of material has to be shifted. The action of the rolls prevents this material from being taken from the outside of the bar, and consequently it is drawn from the interior—hence the hollow, hence the tube. Soon after entering the rolls a small central fracture is formed, which widens out to a hollow space as the increased stretch is made to take effect in an increased twist acted on from the surface. The increasing twist of the fiber of the bar while passing through the rolls and the peculiar relation kept up between longitudinal and turning action is the characteristic of the Mannesmann tube-rolling machine, and this action it is that enables it to make a tube from a solid bar or ingot. Though the bar is thus converted into a tube by the action of the rolls, and their action only, a mandrel is generally used to finish and smooth the interior and enlarge the tube. This use

of the mandrel has led to the erroneous belief that it is necessary to form the hole in the bar. No machine, however, could stand the strain if it were attempted to force a mandrel longitudinally through a solid bar of hot steel. Such an operation is impossible. Just sufficient power is used to form the hollow in the bar from the action of the rolls on its outside, and into this hollow the mandrel enters, smooths the inside, and, when required, enlarges the tube. Thus we have the strange experience in rolling that, by one operation, the bar is made hollow and also longer and wider than when it entered the rolls a few seconds before. In a specimen placed before you is the proof that the hollow in the interior of the bar is formed without the intervention of a mandrel. This piece in its present shape is obtained by interrupting the action of the rolls while the bar is still on its way through them, and then breaking off the bar so as to expose that part where the hollow is just commencing to form. This piece is sound in its solid part, as well as in the hollow part, and the inner surface of the commencing tube is crystalline. This shows that no mandrel can have acted on it. Besides this, the inner surface is not oxidized as it would have been if it had been exposed to the air at a red or white heat. The bright surface is preserved because no air need enter the tube during formation. Until such a specimen as you have before you is cut open a vacuum exists in the interior, both ends being hermetically closed. Such a specimen is made by slightly pointing the bar at the two ends, so that they escape the full action of the rolls at its entry and exit.

This curious result can always be obtained, and it quite disposes of the allegations that the whole is made by a mandrel. The specimen shows also both how the tube in the center commences by a fracture of the metal and widens out, and also the twist of the fibre is seen which has the appearance of a rope. This peculiar twist of the fibre assists in giving the tubes their great toughness and resisting power. The various specimens put before you are mostly produced from the relatively cheap open-hearth steel. The Mannesmann process in shaping metals upsets most of the hitherto accepted ideas and conditions, inasmuch as, instead of avoiding any twist of the fibers, it by one operation gives the greatest possible twist to the fiber with a corresponding stretch of material. It moreover, as I have already said, may, assisted by a mandrel, increase the outer diameter of a bar instead of diminishing it, as do all other rolling mills. The tube produced by the Mannesmann process is generally greater in diameter than the bar from which it is formed.

The child is at its birth larger than the parent. From this description and the facts here attempted to be given, it is evident that we have in the Mannesmann process a system of rolling as new as it is capable of producing effects hitherto not contemplated. In combining all the various systems of rolling, as described above, it may claim to be called the universal system of rolling, in which all hitherto known rolling processes represent a part. The old polishing and straightening machine could never, it is evident, produce like results, because the essential constructive conditions are wanting. It is remarkable that not only competitors, but otherwise competent men, rejected the Mannesmann process as either not new, or as being wrong in principle and generally impracticable, and this sweeping condemnation was supported by arguments apparently logical and sound. I trust this short explanation of an intricate and novel process, and I may say principle, of rolling tubes from solid ingots may assist in dispelling the incredulity and prejudice that has grown up around it.

A New Cane Mill.

Messrs. Krajewski & Pesant, proprietors of the Erie Basin Iron Works, at Brooklyn, N. Y., have just completed and ready for shipment an improved form of cane mill which, aside from novelty of design, is remarkable for the fact that it is probably the largest piece of machinery of this kind that has ever been turned out.

The mill was built for the estate San Ramon, Cuba, and, unlike the ordinary forms having simply two crusher rolls, it has four rolls, two of them being what are termed cutter rolls for breaking up the cane before it passes to the crusher rolls proper. These cutter rolls are about 28 inches in diameter and 7 feet long, and consist of steel rings with suitable cutter projections slipped over wrought-iron shafts. The cane in passing through them is thoroughly broken up, and yields about one-half its juice. It is then fed through the crusher rolls, which also measure 7 feet in length, but are 6 feet 6 inches in diameter, and which extract the remaining juice, all of which falls into a large pan underneath, and can there be drawn off. By means of a pressure regulating device a pressure ranging up to 1000 tons can be brought on the rolls. Power for driving these is supplied by a 250 horse-power engine of the plain slide-valve type, the exhaust being used for heating the vacuum pans. Some idea of the size of the mill can perhaps be formed when we state that with engine and gearing complete it weighs over 300 tons. By means of the cutter rolls, which constitute the principal feature of the mill, a large increase is secured in the proportion of juice obtained as compared with the delivery of the ordinary two-roll crusher mill, and Mr. Krajewski tells us that they are now furnishing independent cutter-roll attachments to be used in connection with the older type mills. In this way the advantages of increased juice production can readily be secured without putting down an entirely new crushing plant.

Combined Engine and Boiler.—Mr.

F. J. Curtis, of Spencerport, N. Y., is putting on the market a combined engine and boiler, which in many respects will be found convenient for small power users. The engine is made either automatic or of the throttling type, as may be desired, and is rated at three horse-power. The cylinder is $8\frac{1}{4}$ inches in diameter by $4\frac{1}{4}$ -inch stroke. The bearings are made to take up wear, and the cross head is provided with adjustable brasses. Boiler and engine are on one base, making a compact and simple outfit. The boiler feed pump is inside the frame.

In our description of the Wheeling Steel Works in *The Iron Age* of October 4 a few errors were committed which require correction. The works were built by the three companies now operating them—namely, the Benwood Iron Works, the Belmont Nail Works and the Wheeling Iron and Nail Works—to manufacture steel for their own use and for the general market. The maximum output has been 450 tons per day and a weekly product of 2200 tons of finished material. The blooming mill is a 36-inch reversing mill built by Mackintosh & Hemphill, driven by a 40 x 48-inch engine constructed by the Southwalk Foundry and Machine Company. The capacity of the shear is to cut an 8 x 15-inch hot section. The E. P. Allis blowing engines are double, having 36-inch steam and 48-inch blast cylinders, of 5-foot stroke. The engine is of special design, the power being transmitted through rocking disks on principal shafts, with a fly-wheel on a countershaft rotated by direct connection with the disks.

Iron Ores and Coals on the South Atlantic and Ohio Railroad.

The control of the South Atlantic and Ohio Road, which extends from Bristol, Tenn., northwest about 40 miles, and which is to be extended to Big Stone Gap, on the line between Virginia and Kentucky, has passed into the hands of Dr. J. M. Bailey, president of the Bailey Construction Company, who has bought all the stock and bonds, and about 30,000 acres of mineral and coal lands lying contiguous to the line of the proposed extension, together with 1000 acres of town lots in Bristol, Tenn., and a similar quantity in Elizabethton, about 20 miles south on the Watauga River in the magnetic ore regions. These purchases aggregate \$1,200,000, and Dr. Bailey has also bought out the interests of the Virginia, Tennessee and Carolina Steel and Iron Company in this region. The money has been provided for the building of the road to Big Stone Gap. The Louisville and Nashville is to extend its Cumberland Valley branch from Pineville to Big Stone Gap, where connection will be made with this road. Arrangements are completed for the erection of a large furnace, with 160 tons daily capacity, at Bristol. The plan proposes two furnaces of that size and a rolling mill. State geologist, John R. Proctor, of Kentucky, has made the following report on the iron and coal fields along the line of the road:

Coals.—Big Stone Gap is one of the natural passes leading from the South Appalachian coal field to the great coalless area stretching from southwestward to the Atlantic Ocean. Immediately north of the Gap the coal measures have a very great thickness above drainage, and there are found a number of thick coals, some of exceptional excellence. One coal has a thickness over a large area immediately tributary to the Gap of from 6 to 8 feet of coal, is most advantageously located for cheap mining, and is a superior coke, having from 93 to 95 per cent. of fixed carbon, with from 3 to 5 per cent. ash, and very low in sulphur. In addition to this very superior coking coal are cannel, splint and excellent gas coals. In Powell's mountain there is a southern extension of this field where three coals are present. An excellent coke has been made from one of these coals. Your company owns the most valuable portion of this outlying coal field. These coals are the more valuable because of the proximity of the iron ores along the line of your road and because they are the nearest coal to the great deposits of high grade Bessemer steel ores in East Tennessee and western North Carolina, and they are of especial value to the South Atlantic and Ohio Railroad because that road has secured the shortest and most available route for the bringing together these cokes and steel-making ores.

Iron Ores.—The red fossil or Clinton iron ore is parallel and immediately along the line of the railway for a distance of 14 miles. This ore is a reliable stratified ore, and three beds are known to be present, one ranging from 30° to 65° thick of excellent soft ore, averaging from a large number of analyses from 45 per cent. to 54 per cent. of metallic iron, another ranging from 18° to 24° thick. This ore can be mined at low cost, say from 50 cents to \$1 per ton, and I think it safe to assume that you have on the line of the S. O. & O. R. R. 20,000,000 tons of this ore that can be put upon the cars at the above named rate. This will give a freightage of 1000 tons a day for 54 years. Recently a new ore horizon has been developed from Big Stone Gap along the line of the road parallel to the above mentioned, and again along the Southern base of Clinch Mount. This is a limonite or brown ore, and is

a reliable and extensive deposit. It is in the Oriskany of the upper Silurian. I superintended the openings made in this ore at a number of places along the line of the road, enough to convince me that there is a deposit of very fine limonite ore exceeding in quantity the Clinton or red fossil ore above referred to. At one point where several openings were made, I was convinced that, along a line of 3500 feet, 780,000 tons of ore can be had above drainage. This ore will yield from 50 per cent. to 55 per cent. of iron, and is low in silica and phosphorus. There is enough of this ore immediately along the line of the road to furnish freight sufficient for a long time to pay a large interest upon the cost of the road. At Clifton Forge District in West Virginia, where this same ore has been developed, the furnaces and industries developed by it furnish one-eleventh of all the freight of the Chesapeake and Ohio Railroad, and the ore there is 90 miles from a coking coal.

In addition to the above, ores are found near to the line of the road: 1, masses in the Trenton and Knox limestones and shales of the lower Silurian. Rich ores, with, in one instance, low enough phosphorus for Bessemer pig; 2, pockets of ore in Medina sandstone near top of Clinch Mountain; 3, stratified ore 2 feet thick in Chemung Shales. Immediately beyond (southeast) Bristol, and only from two to seven miles distant, are large deposits of semi-magnetic ores, with from 55 per cent. to 60 per cent. iron and very low in phosphorus. I will not dwell here on the immense deposits of limonite ores on the waters of the Watauga, and the specular and magnetic ores, nor on the large deposits of manganese, although these great deposits must in large measure be smelted by the coke from Big Stone Gap and Stock Creek, and thus furnish an immense freightage to the S. A. and O. R. R. The Norfolk and Western extended a branch road to the Cripple Creek ores on the south and to the coal on the north, and developed a mineral freightage of 48,311 tons in 1882 to 1,417,549 tons in 1887. The S. A. and O. will penetrate a coal field equal if not superior, and passes through deposits of ore more abundant and superior in quality to anything yet reached by the N. & W., and there is no reason why the freightage of the S. A. & O. may not be developed to the utmost capacity of the road.

I wish to call attention to the great advantage possessed by your road in the manner in which it secures great natural passes through the mountains. There are seven ranges of mountains running northeast and southwest, opposing almost impassable barriers to the construction of railways except by the route secured by this road. Some of the most successful manufacturers of iron and steel in Pennsylvania have made large investments along the line of the S. A. & O. R. R., intending to develop their properties as soon as the road reaches the coking coals. This insures a heavy permanent traffic to the road. The extension of roads now in progress of construction both to the southeast of Bristol and to the northeast and northwest of Big Stone Gap will make the S. A. & O. R. R. an important and indispensable link connecting the Great Ohio Valley with the South Atlantic Seaboard. I know of no road with a greater combination of advantages: Coals, iron ores of exceptional excellence, and in the greatest abundance, timber and building stone, fertile soils, and the certainty of favorable connections with important railways at both termini.

The product of the Calumet and Hecla mine for the month of September was the largest it has ever made, amounting to 3084 tons, 1305 pounds. Its product for

the week ending Monday, October 1, was also the largest ever made in one week, amounting to 789 tons, 135 pounds. Lately the mine made its best record for one day, the profit on the yield of 24 hours' work being estimated at \$18,000.

Pittsburgh Freight Rates Eastward!

—At a meeting of the Pittsburgh Committee of Freight Agents, held in that city on Friday, the 5th inst., new rates were made to all points East. This was done to make the tariff conform with the through rates from Chicago to New York, which go into effect on the 15th inst. The rates from Pittsburgh and all Pittsburgh group points are: To New York, first-class, 45 cents; second, 39 cents; third, 30 cents; fourth, 21 cents; fifth, 18 cents; sixth, 15 cents. Iron and steel less than carloads, 19 cents, and carloads, 16 cents per 100 pounds. Pig iron, in carload lots, \$2.40 per gross ton. To Philadelphia, 39 cents, 33 cents, 28 cents, 19 cents, 16 cents, 13 cents, 14 cents, 11 cents and \$2. To Boston, 51 cents, 45 cents, 33 cents, 24 cents, 21 cents, 18 cents, 19 cents and 16 cents. To Baltimore, 37 cents, 31 cents, 27 cents, 18 cents, 15 cents, 12 cents, 13 cents and 10 cents and \$1.80.

Shrinkage Allowance for Tires.

Breakages of tires on railways may, to some extent, be accounted for by the fact that many tires are put on with too great an allowance for shrinkage. This keeps the tire in severe tension all the time and is a constant source of danger. There is every reason to believe that the allowances established about a year ago by the Master Mechanics' Association are about right, and it may, therefore, not be without interest to give them here. They are for inside diameters of tire:

38 inches less 0.040 inch.	56 inches less 0.060 inch.
44 inches less 0.047 inch.	62 inches less 0.068 inch.
50 inches less 0.053 inch.	68 inches less 0.070 inch.

Judge Andrews, of the Supreme Court in this city, has decided in favor of the application of the Elevated Railroad Companies for the appointment of Commissioners to assess the value of the easement which they require in operating their lines in front of private property. He became satisfied that all efforts of the petitioners to purchase real estate, in cases where suits are pending, would be fruitless on account of the impossibility of agreeing upon a "reasonable" valuation. Therefore, each of the parties may nominate a commissioner, and a third will be appointed by the court to act in all the proceedings.

The question has been asked, and last year was submitted to a committee of the Master Mechanics' Association, how big should a locomotive boiler be? The committee submitted their answer in a report to the last convention of the association, and the rule given in that report for calculating the heating surface of a locomotive boiler for engines with cylinders of 24-inch stroke was that the area of one piston in square inches should be multiplied by 5.8 and the product would be the total heating surface in square feet.

The suit of I. Townsend Burden against James A. Burden and the Burden Iron Company which was being heard before Justice Parker in the Circuit Court at Troy, N. Y., has been postponed till November 15.

It is reported that the Kishpaugh mines, in Warren County, N. J., have suspended operations. They were owned and operated by Pardee & Co. A shaft has been sunk to the depth of 500 feet, and the vein is found to be exhausted.

Our Population in 1890.

The census of 1890, preparations for which are already being made, promises to show in the United States a population of more than 70,000,000. The population in 1880, according to the census of that year, was 50,155,783 persons, of whom 43,475,840 were native, and 6,679,943 foreign-born. The natives had increased 10,484,698 from the figures of 1870—32,991,142—or 31.5 per cent. The foreign element had gained more slowly, however, bringing the percentage for the entire population down to 30 per cent. The same rate of increase applied to the census of 1880 will, according to the *Philadelphia Record*, give an increase of 15,046,639 persons during ten years ending in 1890.

The immigration between 1870 and 1880 was comparatively light, only 1,112,714 persons having come to this country during that decade. For the past few years, however, it has been unprecedented. The immigration since the last census has been as follows :

1880.....	457,257	1886.....	334,203
1881.....	669,431	1887.....	400,109
1882.....	788,992	1888 (8 months)	380,000
1883.....	603,322		
1884.....	518,592		4,637,252
1885.....	395,346		

Estimate for 2 years and 4 months....1,100,000

Total for 10 years.....5,737,252

Add this total to the increase in the native-born population at the rate which prevailed from 1870 to 1880, and it will be found that the probable increase in population during the present decade, after making due allowances for births and deaths, will have been 20,246,639, and the total population in 1890, native and foreign-born, 70,322,479, divided as follows :

Native.....	32,991,142	43,475,840	58,522,479
Foreign-born...	5,567,229	6,679,943	11,800,000

Total.....38,558,371 50,155,783 70,322,479

It is very evident that the foreign element will form a much larger proportion of the population in 1890 than ever before. In 1860 this proportion was about 13 per cent.; in 1870, 14 per cent., and in 1880, about 15 per cent. In 1890 it will not be far from 18 per cent.

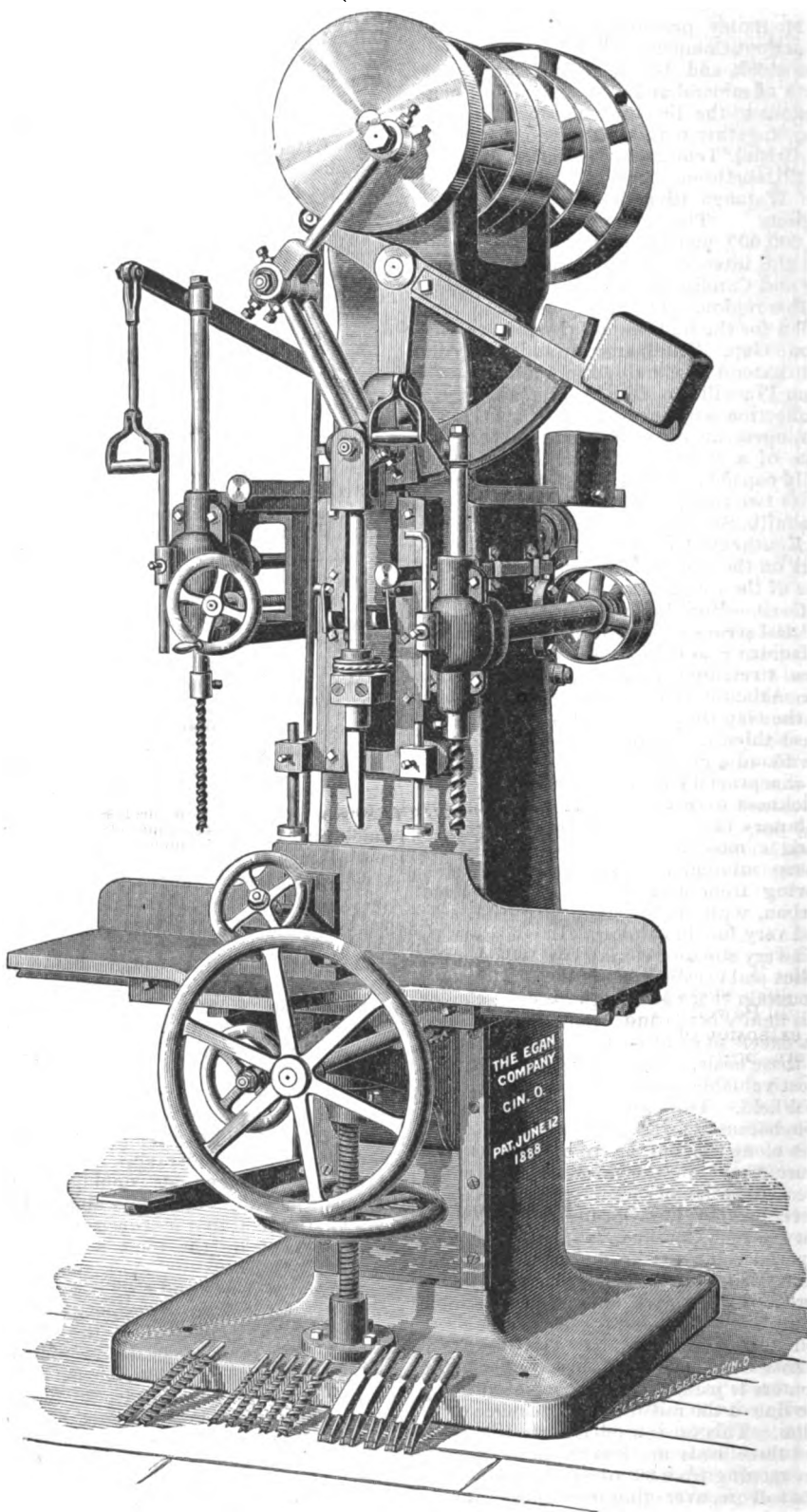
New Car Mortiser and Borer.

We illustrate on this page a new car mortiser, built by the Egan Company, 179 to 199 West Front street, Cincinnati, Ohio. It is a very heavy and substantial machine, designed to cut any size mortise from $\frac{1}{4}$ to 3 inches wide and 6 inches deep in all kinds of wood.

The column is one casting, and, being hollow, makes it amply strong enough to stand up to the heaviest strain to which a machine of this kind may be put. The tight and loose pulleys are placed on the fly-wheel shaft to run between bearings, thus equalizing the strain of the belt and keeping the shaft in line. All the working parts are planed perfectly true, and are accurately fitted and gibbed, which allows the machine to cut a perfectly straight mortise. The chisel mandrel is large in diameter, and is made of the best cast steel. It is connected to a solid ram working in planed ways, making it impossible for the mandrel to spring when mortising the hardest kind of wood at the full stroke. The chisel-reverser is entirely new and perfectly automatic. It is controlled by the treadle movement operating upon the chisel mandrel, and reversing the chisel every time the treadle is brought to the up-stroke. All other car mortisers with a graduating stroke are reversed by hand. The radial slide is entirely new, and is covered by letters patent. It is at-

tached to the connections and operated by the treadle, and prevents the slightest jar on the foot, even when mortising without first boring a hole to admit the chisel, which, it is claimed, has never been accomplished heretofore on a machine of this class. The bed is very large, and is

in. The auxiliary mandrel has a 16-inch stroke, and may be moved by a hand-wheel and screw to bore at any point within the width of the bed, which is 18 inches. Each boring mandrel is driven by a pulley on the machine, making the machine complete and self-contained.



CAR MORTISING AND BORING MACHINE, BUILT BY THE EGAN CO., CINCINNATI, OHIO.

raised and lowered by a right and left hand screw, placed vertically between the bottom of the bed and the base of the column. It has a lateral movement of 4 feet, and a cross movement for mortising of 16-inch timbers.

There are two boring mandrels. One is in line with the chisel, and is intended to bore the hole for the chisel to start to work

Each machine is furnished with seven chisels, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1 $\frac{1}{2}$ and 1 $\frac{3}{4}$ inch, with augers to match; also with three boring bits for the auxiliary boring mandrel, $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ inch. One of these mortisers was recently shipped to the American Refrigerator Transit Company, St. Louis, Mo., for use in their car-shops, where it is doing good work.

THE MINING ENGINEERS

MEETING AT BUFFALO.

The 52d meeting of the American Institute of Mining Engineers was held in Buffalo last week, the members gathering for the opening session on Wednesday evening in the rooms of the Society of Natural Science, an address of welcome being delivered by Dr. Julius Pohlman, which was responded to by Prof. William B. Potter, of the Washington University, St. Louis, president of the Institute. The latter delivered an address dealing largely with the necessity of supplementing theoretical instruction with training in practical work. Dr. R. W. Raymond presented a brief paper on "A Gold Breast-plate from Central America," found by miners who were digging the foundation for a stamp mill at the Great Remance quartz mine, 15 miles from Santiago, United States of Colombia.

Wednesday morning the members were taken by a special train on the Western New York and Philadelphia Railroad to Dunkirk, where they visited the Brooks Locomotive Works, and were entertained subsequently. The evening session was opened by a paper read by F. V. Greene, formerly in charge of Government work at Washington, and now Vice-President of the Barber Asphalt Paving Company.

ASPHALT AND ITS USES.

He reviews briefly the characteristics of hydraulic and bituminous cements, the solid native mineral pitch or hard bitumen found in nature being what is known as asphalt. By far the most important, commercially, are the combinations of bitumen with quartz or limestone. Among the former are the bituminous sandstones and sands of France, which contain from 5 to 15 per cent. of bitumen mixed with sand and a small amount of limestone and clay. They are used for the extraction of bitumen, the process consisting of boiling in water at a temperature which fuses the bitumen and allows the sand to settle. The greater portion of this supply has now been exhausted. The bituminous sandstones of California have been used lately to supply the material for paving in Los Angeles and other cities on the Pacific coast, the reports of the quality being conflicting.

The bitumen limestones of France, at Seysell and Val-de-Travers contain about 10 to 11 per cent. of bitumen and have furnished the material with which portions of the streets of Paris and other cities are paved, Paris having about 13 miles, London 15 miles, Berlin 9 miles, and other cities 10 miles. Their main drawback has been the tendency to polish under traffic, which has made the pavement slippery. For sidewalks in Paris and elsewhere a preparation known as "asphalt mastic" is used. The powdered rock is mixed with 8 per cent. of molten Trinidad asphalt cooked for five hours at 280° F., and run into molds weighing about 50 pounds, in which form the mastic is sold. In use 60 parts of broken mastic is mixed with 4 parts of Trinidad asphalt and 36 parts of fine gravel and sand cooked for about two hours at 300° F., stirred and poured on the prepared foundation of the sidewalk. The aggregate length of these sidewalks in Paris is about 1000 miles.

The asphalt of Trinidad is found in a so-called "lake," situated at an altitude of about 100 feet above the sea, and about 3 miles from the shore of the island at the village of La Brea. Its area is about 114 acres and its depth as far as ascertained by rude borings is reported to be about 18 feet at the sides and 78 feet in the center, a bed of blue clay underlying it. If these figures are correct the lake contains about 6,000,000 tons of asphalt, the

excavation thus far of 180,000 tons not having appreciably lowered its level. It is an entire misnomer to call it a lake. It is a level tract of brownish material, cracks or fissures, having a width and depth of a few feet, appearing here and there over the surface, a part of them filled with rain water or with dust and vegetation. It is shipped in bulk, and on being unloaded is treated by a slow fire in large tanks for about five hours, the moisture only being expelled without changing its chemical condition. The crude asphalt by analysis of Prof. H. C. Bowen contains 56.79 per cent. of bitumen, 33.99 per cent. of earthy matter, chiefly clay and fine sand, and 9.31 per cent. of vegetable matter.

In its natural state it is too brittle at ordinary temperatures, so that it is tempered with some form of oil, one-third of turpentine and one-sixth of shellac being used for varnish, and one-sixth of petroleum for paving cement or for coating water pipes. Asphalt is employed also as an ingredient in the mixture known as bitile, made by the Callendar Insulating Company, used to insulate electric cables. Mr. Greene cited some interesting applications of asphalt as a cement in masonry work, among others the brick arch spanning the large wrought-iron water main on the high bridge over the Harlem River, and the La Salle street tunnel under the Chicago River. Of the use of asphalt in foundations, two samples are given in a paper read before the English Institution of Civil Engineers in 1880, by W. H. Delano. One was the foundation of a rock disintegrator running at a high rate of speed, first built upon a concrete foundation. On the opposite side of the street was an establishment for painting on glass and china, the business of which was seriously interfered with by the vibrations. After rebuilding the foundation in bituminous concrete the vibrations were imperceptible.

The second case was the foundation of a large trip hammer, weighing 45 tons, erected at the Paris Exhibition of 1867. In order to reduce the concussion, this was built in bituminous concrete with entire success.

Of all the uses made of asphalt, by far the most important is the paving of roadways. During the last 12 years, upward of 3,500,000 square yards of genuine asphalt pavements have been laid in the United States. They extend a length of more than 200 miles, and are used daily by probably 50,000 vehicles. The cubical contents are over 7,000,000 cubic feet, and with their foundations of concrete, of 16,000,000 cubic feet, their weight represents 1,500,000 tons.

The city of Buffalo has now the distinction of having more asphalt pavements than any city in the world, though the combined area of the asphalt and the tar pavements in Washington is still greater by about 50 per cent. The area of the asphalt at Buffalo is 1,000,248 square yards, extending over a length of 51 miles more than the combined area of all the asphalt roadways in Europe.

Mr. Greene described the method of making the asphalt pavement, and noted the following striking illustration of the strength of such a concrete with age: At Washington he observed a small hole in such a pavement, and having had it opened found that the cavity was about 20 x 40 feet in extent and from 4 to 5 feet deep. The earth had been washed into a defective sewer, and it must have taken months, if not a year, for this to occur, the hole in the sewer being quite small. During all this time the pavement was simply a concrete arch 6 inches thick and paving a space of about 20 feet.

Mr. Greene gave the following excellent reason for the fact that a good deal of the so-called asphalt pavement, in reality

made of tar, soon becomes worthless: The products of coal tar are subject to oxidation by the atmosphere, which in time renders them brittle and friable and devoid of cementing qualities. The Trinidad asphalt is not subject to this defect, for the reason that it has been exposed for centuries to the burning sun of a tropical climate and the atmosphere can have no further effect upon it. After dealing with these so-called monolithic pavements, Mr. Greene described the block pavements, which are very serviceable under certain conditions. The fact, however, that sand cannot be used in the mixture of the blocks, because it cuts the molds, makes it impossible to employ them for heavy traffic.

One interesting point was raised by Mr. Greene in conclusion in his paper, and that is the saving in traction force and in wear and tear of vehicles. He stated that it was susceptible of direct proof that if the cost of paving a large city like New York with asphalt be counted, maintaining it at the price shown by years of experience under varying weights of traffic, and if the saving in cost of transportation and wear and tear of vehicles be counted, the saving is nearly three times the cost. The transportation through the streets of New York is something over 40,000,000 ton miles per annum, costing over \$15,000,000, and the repairs of its 30,000 vehicles and the shoeing of its 40,000 horses cost nearly \$4,000,000 in addition.

The same force that draws one ton over a stone block pavement can draw three tons over asphalt, and the cost of repairs of vehicles and horses can be reduced about one-quarter by the use of smooth pavements. The saving runs into the millions of dollars annually.

During the course of the discussion Dr. Raymond gave the experience of the Brooklyn Subway Commission, of which he is a member, with asphalt pipe, the main difficulty being that in endeavoring to make joints ridges formed on the inside which injured the covering of the cables.

Dr. Julius Pohlman then presented a sketch of his views on the life history of Niagara Falls, in which he took the ground, elaborating his evidence, that the Falls did not cut their way back from Lewiston, but from a point about the present Whirlpool Rapids. He condemned also the opinion so generally held that the Falls moved upward at a slow rate by showing that between 1841 and 1886, the first and last surveys made, the Horseshoe Falls went back 485 feet, or at the rate of about 9 feet a year. Dr. Pohlman's address was received with hearty applause, and he was urged to present his paper in form for the transactions.

Dr. R. W. Raymond then read a paper on "Soaping Geysers." It appears that his attention was directed to it by the story of a party of returned tourists of a Chinese laundryman in the National Park who had included in his cabin a hot spring, of which he was accustomed to avail himself in his business, and who, on one occasion, having thrown a lot of linen into this spring to soak over night, had added a piece of soap to facilitate the process, and had been considerably surprised when, stimulated by this soap, the spring had suddenly become a geyser and wrecked his establishment.

Mr. Arnold Hague, geologist in charge of that part of the Survey which includes the National Park, confirmed the action of soap upon geysers in a letter to Dr. Raymond, and noted the effect of the substitution of soap by lye, which produces much more rapid action. Mr. Hague's letter goes into detail in regard to the results of his investigations, to which Dr. Raymond has added his views on the probable causes of the action of soluble salts thrown into the water.

Thursday had been set aside for a number of excursions, which were to enable the members to inspect the coal and ore docks and elevators for which Buffalo has grown so famous, but inclement weather interfered with the projected tour, only a few undertaking the trip. The afternoon was occupied with a visit to the water works pumping station, the Buffalo Cement Company and the Barber Asphalt Paving Company, a number of carriages conveying the party over a long route through different parts of the city, to enable them to judge by themselves of the difference between the ordinary methods of paving streets and those based upon the use of asphalt.

In the evening the secretary read an interesting paper by Bernard E. Fernow, of Washington, on "Forestry and Mining," and a note by Uriah Cummings, of Buffalo, on the "Artificial Propagation of Mushrooms in the Abandoned Quarries of the Akron Cement Company, at Akron, N. Y."

Friday morning was devoted to a session, the first most important paper being read by R. W. Hunt, formerly of the Troy Steel and Iron Company, and now located at Chicago. We shall present Mr. Hunt's paper in greater detail, but may state that its object was to give the grounds for the adoption of a series of new specifications for rails. Mr. Hunt, we may say in passing, expressed the opinion that, generally speaking, the heaviest sections which have begun to secure recognition in the United States have been disappointing, so far as their wear is concerned, and that in the majority of instances their relative failure to yield adequate wear is due to faulty design. Generally speaking, the increased weight has been secured by a greater depth of metal in the head, a policy which Mr. Hunt questions chiefly on the basis of a long experience in rail manufacturer. He quoted an instance of two rails, a 65-pound and a 60-pound, which were identical except that the additional weight of the former had been secured by adding to the top. The lighter rail gave the better results. Mr. Hunt urges that the rails should be straightened as much as possible when hot, the minimum of work being done by the gagging press, and condemns the application of a gag to flanges. He urges the use of harder steel for heavier rails, and insists that the practice of turning the ingots on their side before their interior has entirely chilled is dangerous, because it is liable to create lengthwise crevices.

R. P. Rothwell, of New York, spoke on the subject of "Electrical Transmission of Power in Mining," the first application of which was made in New Zealand to drive a stamp mill. In Aspen, Col., water-power has been transmitted to the mines, to the pumping and hoisting machinery, and also to the machinery at the coke ovens. A large installation is now being put in at the Nevada mill on the Comstock Lode, water being taken to the level of the Sutro tunnel, giving a 1630-foot head, which drives six 40-inch Pelton wheels, each of 135 horse-power, driving the dynamos direct. The Brush Electric Company have provided the dynamos, each of 135 horse-power, and six electric motors, each of 90 horse-power, which are to drive the machinery of the Nevada mill. The longest transmission thus far has been on the Feather River in California, the circuit being about 18 miles. In Alaska, the water-power on the mainland is to be used to drive 240 stamps, of the famous Treadwell mine.

In the afternoon the Institute visited the works of the Holly Mfg. Company, at Lockport, and the Cowles Electric Reduction Works at the same point. On Saturday morning the members took a special train to Piffards, where they visited the

rock-salt mine of the Retsof Company, near that point, the majority of the members being lowered into the 1100-foot shaft and inspecting the underground workings, which are carried on in two beds, one of 20, and one of 60 feet thickness. Above ground they viewed the operations of crushing and preparing the salt for market. Returning to Buffalo, the meeting adjourned.

The Senate Tariff Bill.

We print elsewhere a table giving, so far as it is possible, a comparison of the rates of duty provided for in the Mills and Senate bills with the tariff as it now exists. A study of it will best show where changes have been made and in what direction. We may note, besides, the following points in the Senate bill:

The iron ore clause contains a provision which puts at rest the moisture question, since it specifies "that in levying and collecting the duty on iron ore no deduction shall be made from the weight of the ore on account of moisture which may be chemically or physically combined therewith."

Mill irons and mill cranks of wrought iron, and wrought iron for ships and forgings of iron or steel, or of combined iron and steel, for vessels, steam engines and locomotives, or parts thereof, weighing each 25 pounds or more, are put at 1.8 cents per pound.

The wire-rod clause is specific and reads:

Rivet, screw, nail, fence and other iron or steel wire rods, whether round, oval, flat or square, in coils or loops or in any other shape, not smaller than No. 6 wire gauge, valued at three cents or less per pound, six-tenths of one cent per pound; and iron or steel flat, with longitudinal ribs for the manufacture of fencing, valued at three cents or less per pound, six-tenths of one cent per pound; provided that all iron or steel rods, whether rolled or drawn, smaller than No. 6 wire gauge, shall be classed and dutiable as wire.

The law relating to ingots, blooms and billets is particularly extensive, and we quote it as below:

Steel ingots, cogged ingots, blooms and slabs, by whatever process made; die blocks or blanks; billets and bars and tapered or beveled bars; steamer, crank and other shafts; shafting; wrist or crank pins; connecting-rods and piston-rods; pressed, sheared or stamped shapes; saw plates, wholly or partially manufactured; hammer molds or swaged steel; gun-barrel molds, not in bars; alloys used as substitutes for steel tools; all descriptions and shapes of dry sand, loam or iron-molded steel castings; sheets and plates not specially enumerated or provided for in this act; steel in all forms and shapes not specially enumerated or provided for in this act; all of the above valued at 1 cent per pound or less, five-tenths of a cent per pound; valued above 1 cent and not above one and four-tenths cents per pound, six-tenths of 1 cent per pound; valued above one and four-tenths cents, and not above one and eight-tenths cents per pound, eight-tenths of 1 cent per pound; valued above one and eight-tenths cents, and not above two and two-tenths cents per pound, nine-tenths of 1 cent per pound; valued above two and two-tenths cents, and not above 3 cents per pound, one and two-tenths cents per pound; valued above 3 cents and not above 4 cents per pound, one and six-tenths cents per pound; valued above 4 cents, and not above 7 cents per pound, 2 cents per pound; valued above 7 cents, and not above 10 cents per pound, two and eight-tenths cents per pound; valued above 10 cents, and not above 13 cents per pound, 3½ cents per pound; valued above 13 cents per pound, 45 per centum ad valorem.

These provisions compare as follows:

Steel valued	Existing law.	Senate substitute.
1 c. per lb. or less.....	45 per cent ..	½ c. per lb.
1 c. @ 1.4 c..	" ..	6-10 c. per lb.
1.4 c. @ 1.8 c..	" ..	8-10 c. per lb.
1.8 c. @ 2.2 c..	" ..	9-10 c. per lb.
2.2 c. @ 3 c..	" ..	1.2 c. per lb.
3 c. @ 4 c..	" ..	1.6 c. per lb.
4 c. @ 7 c..	2 c. per lb.	2 c. per lb.
7 c. @ 10 c..	2.75 c. per lb.	2.8 c. per lb.
10 c. @ 13 c..	3.25 c. per lb.	3.5 c. per lb.
above 13c.	3.25 c. per lb.	45 % ad val.

Plates are not mentioned in the Mills bill. In the Senate bill the clause relating to them reads as follows:

Boiler or other plate iron or steel, except saw plates hereinafter provided for, not thinner than number ten wire gauge, sheared or unsheared, and skelp iron or steel sheared or rolled in grooves, valued at two cents per pound or less, one cent per pound; valued above two cents and not above three cents per pound, one and two-tenths cents per pound; valued above three cents and not above four cents per pound, one and six-tenths cents per pound; valued above four cents and not above seven cents per pound, two cents per pound; valued above seven cents and not above ten cents per pound, two and eight-tenths cents per pound; valued above ten cents and not above thirteen cents per pound, three and one-half cents per pound; valued above thirteen cents per pound, forty-five per centum ad valorem; *Provided*, That all plate iron or steel thinner than number ten wire gauge shall pay duty as iron or steel sheets.

In the case of quite a number of articles changes have been proposed by the Senate Substitute bill, where the existing law and the Mills bill agree. We enumerate them as under, giving the rate of the Senate bill and adding the present rate in brackets. It will be observed that these readjustments are in the direction of a lowering of duties in the majority of instances.

Cast-iron vessels, plates, stove plates, andirons, &c., 1.2 cents per pound [1½ cents].

Malleable iron castings, 1½ cents per pound [2 cents per pound].

The Senate bill follows the present law so far as the fact that no allowance is made for discoloration or partial loss in consequence of rust is concerned. It repeats also that paragraph which defines what material is to be regarded as steel. It has also the following two new clauses:

All articles not specially enumerated or provided for in this act, wholly or partly manufactured, made from sheet, plate, hoop, band, or scroll iron or steel herein provided for, or of which such sheet, plate, hoop, band, or scroll iron or steel shall be the material of chief value, shall not pay a lower rate of duty than that imposed on the sheet, plate, hoop, band, or scroll iron or steel from which they are made, or which shall be the material of chief value.

On all iron or steel bars, rods, strips or steel sheets, of whatever shape, other than the polished, planished, or glanced sheet iron or sheet steel hereinbefore provided for, and on all iron or steel bars of irregular shape or section, which are cold-rolled, cold-hammered or polished in any way in addition to the ordinary process of hot rolling or hammering, there shall be paid one-fourth of one cent per pound in addition to the rates provided in this act; and on steel circular saw plates there shall be paid one cent per pound in addition to the rate provided in this act.

This makes the rates compare as follows:

Bar Iron and Steel.	
Existing law.	Senate substitute.
45 % plus ¼ c. per lb.	1.6 c. per lb. plus ¼ c.
2 c. plus ¼ c. per lb.	2 c. per lb. plus ¼ c.
2½ c. plus ¼ c. per lb.	2.8 c. per lb. plus ¼ c.
3½ c. plus ¼ c. per lb.	3½ c. per lb. plus ¼ c.
Strips of Iron or Steel.	
45 % plus ¼ c. per lb.	1.6 c. per lb. plus ¼ c.
2½ c. plus ¼ c. per lb.	2.8 c. per lb. plus ¼ c.
3½ c. plus ¼ c. per lb.	3½ c. per lb. plus ¼ c.
Sheet Iron.	
1.5 c. per lb. plus ¼ c.	1.5 c. per lb. plus ¼ c.
Sheet Steel.	
45 % plus ¼ c. per lb.	1.6 c. per lb. plus ¼ c.
2 c. per lb. plus ¼ c.	2 c. per lb. plus ¼ c.
2½ c. per lb. plus ¼ c.	2.8 c. per lb. plus ¼ c.
3½ c.	3.5 c. per lb. plus ¼ c.

Steel circular saw plates, 1 cent in addition, making it 4½ cents per pound [8½ cents and 4½ cents per pound].

For the following items we do not possess the equivalents in the Mills bill at this writing, but we give the present duties and the provisions of the Senate bill.

Swords, sword blades and side arms: Present, 35 per cent.; Senate, 35 per cent.
Table knives, &c.—Valued at not more than \$1 per dozen: Present, 35 per cent.; Senate, 20 cents per dozen + 30 per cent. Valued at \$1 to \$3 per dozen: Present, 35 per cent.; Senate, 50 cents per dozen + 30 per cent. ad valorem. Valued at \$3 to \$8 per dozen: Present, 35 per cent.; Senate, \$1 per dozen + 30 per cent. ad valorem.

Penknives, pocket-knives, blades and razors: Present, 50 per cent.; Senate, 50 cents per dozen blades and 25 per cent. ad valorem.

Muskets and sporting rifles: Present, 25 per cent.; Senate, 25 per cent.

Double-barreled sporting breech-loading shot-guns: Present, 35 per cent.; Senate, \$10 each and 25 per cent. ad valorem.

Pins: Present, 30 per cent.; Senate, 30 per cent.

Screws.—More than 2 inches long: Present, 6 cents per pound; Senate, 5 cents per pound. Over 1 and less than 2 inches: Present, 8 cents per pound; Senate, 7 cents per pound. One-half inch to 1 inch: Present, 10 cents per pound; Senate, 10 cents per pound. One-half inch and less: Present, 12 cents per pound; Senate, 14 cents per pound.

It will be observed that the duty on cutlery is to be modified, and that the rates on the larger screws are lowered, while those on the smallest sizes are increased.

The clause on lead ore has the following addition, which it will be observed covers a point to which the trade has given much attention of late—viz.: Lead ore

The estate of Percy Peck, at Anthony, R. I., consisted of 5 acres of land and the buildings formerly used as a machine shop by S. Colvin & Co., were sold at auction October 2 to Searles Capwell, of Coventry, for \$1400.

The will of the late George M. Cruickshank has been proved, and Mary G. Cruickshank appointed administratrix of the estate; bond, \$12,000.

The property of the Holmes Burglar Alarm Telegraph Company has been sold, and the right, title and interest of all patents belonging to the Holmes Burglar Alarm Telegraph Company, of New York, and of the Holmes Electric Protection Company have been transferred to the Rhode Island Electric Protection Company for the State of Rhode Island, making it a local company. LEONIDAS.

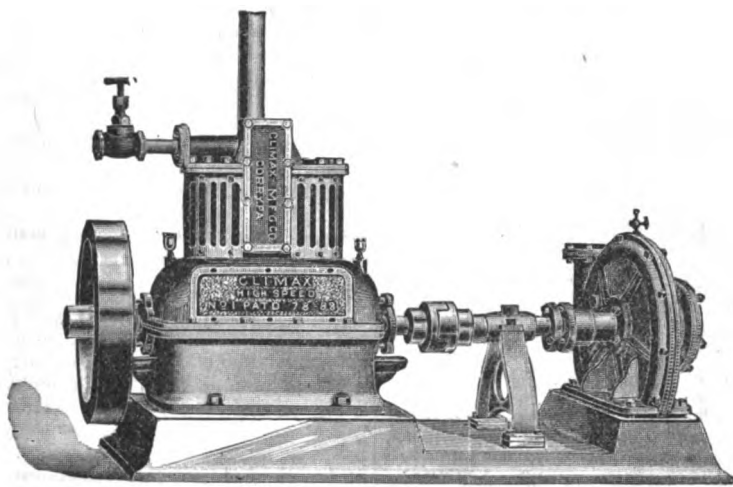
James R. Hosmer, Consul-General of the United States to Guatemala, in a report to

The Growth of the Stove Industry.

A reception and banquet were given last week by the business men of Boston to visiting merchants, with the object, as explained by Chairman George Hutchinson, of promoting mutual interests. Twelve long tables were spread in Mechanics' Hall, with 1400 plates. Speeches followed by Howard W. Spurr, E. Waldo Cutler, Geo. W. Walker and others. The last mentioned spoke of the marvelous growth of the stove industry, by comparison with what it was 50 years ago. He said: "No longer ago than 1829 stove plates were made from iron flowing directly from blast furnaces in Pennsylvania, Virginia and Kentucky, which was then sent to Albany, N. Y., to be mounted into stoves. Prior to 1829-30 wooden patterns for molding purposes were made of mahogany and strapped with light irons to hold them together. To the late Mr. Annis Lincoln, of Norton, Mass., belongs the distinguished honor of making the first stove plates from metal patterns. The first stoves made by him were supplied with wrought-iron feet riveted to the bottom. I wonder what General Manager Furber, of the Boston and Maine Railroad, would say if a shipment of these stoves were sent to one of his depots for transportation? I reckon he would strike against schedule rates and order them billed by the square foot. Fifty years ago cooking stoves were made with only one pot-hole, but an inventive Yankee conceived the idea of making them with two holes, until now they have more holes than pots. Foreign manufacturers acknowledge the superiority of American stoves by purchasing them and then fitting them for patterns to cast from. Stoves and ranges made in England and Scotland could not be sold in this country except for old iron, but I suppose they answer the purposes of free traders. Until within a few years Canada was a good customer for stoves. The duty of 25 per cent. imposed not only protects her mechanics, but deprives us of what was once a lucrative business. From small and crude beginnings the stove business in this country has assumed vast proportions. Our annual product is, in round numbers, not far from 3,000,000 stoves; the value of same is about \$45,000,000. Our facilities, quality of iron, mechanical skill and inventive powers cannot fail, sooner or later, of commanding a large share of the stove trade of the world. That our ranges and stoves have no equals made in any other country is an admitted fact. Those made in New England are of the finest grade, consequently meet with a ready sale at home and abroad."

In the Madras Presidency, in India, the River Kistna is crossed by a cable swung between supports 5070 feet apart, and one has just been put up in China 4648 feet in span. The versed sine of the curve formed by this cable is 514 feet. The whole weight of the suspended portion is only 6½ tons, and the breaking resistance 150,000 pounds, so that there would seem to be no great difficulty, by building the supports high enough, in bridging almost any chasm by similar ropes, and establishing footways between them.

The old Huron Furnace, at Jackson, Ohio, which has been idle since 1884, has been generally repaired and was put in operation last week under the management of a new organization, known as the Jackson Iron Company. The iron will be of the Jackson County silvery class, and the furnace has a capacity of 30 tons per day. Messrs. Charles Himrod & Co., Chicago, have been appointed sales agents for the West and Northwest.



SMALL CENTRIFUGAL PUMPING PLANT.

containing silver, or silver ore containing lead, shall pay a duty of one and one-half cents per pound.

Providence Notes.

The fine steel yacht Ballymena, 148 feet long, was launched from the boathouse of the Herreshoff Mfg. Company, at Bristol, at 8.35 o'clock on the morning of October 6. She is owned by George S. Brown, of the firm of Brown, Shepley & Co., of Baltimore. The Ballymena is the first steel vessel ever built in Rhode Island, and is pronounced to be one of the finest ever built in the country.

The building of the steel torpedo boat for the Government will be begun immediately on the spot from which the Ballymena was launched.

A gang of 30 employees of the American Long-Distance Telephone Company, who have been at work on the line between Worcester and this city, took the Shore Line express train for Bridgeport, Conn., on October 5. From the latter city to New York they will stretch 18 copper wires on poles 50 feet high.

John. A. Moore, whose building was burned down last spring on the Harris farm, Sockanosset, R. I., on which are located the Cranston coal mines, has erected another building, 30 x 40 feet, in which he has placed an engine of 20 horse-power, boiler and crusher. It has a capacity of turning out and crushing about 80 tons of coal a day. The coal from this mine, which, until about three years ago, had remained idle for more than a quarter of a century, has been used continually by Superintendent Eames at the works of the Carbon Iron Company, located on the same farm, for the past year.

the Department of State, says there are favorable inducements for the establishment of factories for glass, wagons, agricultural implements and many other articles of general use which are now imported and command exorbitant prices. Common laborers receive from 37½ to 75 cents per day, and railroad laborers \$1. American carpenters and painters are paid \$4.50 to \$5 a day and machinists \$5 to \$6. American merchants in Guatemala, Mr. Hosmer says, assert that they are compelled to purchase their wares in Europe because the goods sent from America are so carelessly packed as to be badly damaged in transit. American-made prints, agricultural implements and cutlery are preferred to those of other countries, and this has led dealers in Germany to imitate American trade-marks and endeavor thereby to sell their wares as of American make.

Direct Connected Centrifugal Pump.

The Baldwinsville Centrifugal Pump Works, of Syracuse, N. Y., are putting on the market a convenient small-size pumping plant, consisting of a centrifugal pump driven by a direct connected Climax engine. The annexed engraving explains the general design. The engine proper, illustrated in *The Iron Age* some time ago, is of the two-cylinder, vertical, single-acting type. The outfit is cheap, light and durable, and will be found desirable for many locations. Where the lift does not exceed 25 feet the engine is connected directly to the pump shaft, but, in case the lift of water exceeds 25 feet, intermediate cut gears are used, so as to attain the proper speed. The pumps are specially adapted to the use of tanners, contractors and for small irrigating plants.

THE WEEK.

When may we expect the next killing frost? On account of the unusual importance of this question just now General Greely has issued an extract from the monthly weather review for July, 1888, which gives the average date of its appearance in past years. The inference is that the outlook for the cessation of the epidemic is not very encouraging, the tables showing that, although killing frost has been observed at St. Augustine, on November 30, the average date is December 24, and one year frost did not appear until February 6.

The Knights of Labor, whose next General Assembly convenes in Indianapolis, November 13, are said to be at present in no pressing need of money. A few weeks ago, when the need of money was extremely urgent, recourse was had to the Order's investment in the knitting mills at Little Falls, N. Y., and as a result \$5000 was realized. This sum placed the board on their feet again, it is said, and will be sufficient to keep the expenses covered until the payment of the October tax affords relief. In addition to the Little Falls investment, it is said, the Order has money invested in the coke region, which is worth fully \$12,000. The headquarters in Philadelphia, for which \$45,000 was paid, have been carefully guarded against mortgages or other encumbrances, it is said, and are worth considerably over \$50,000 to-day. The printing-office plant, worth \$10,000, has also given the Order a foothold, it is claimed, which is not likely to be shaken.

The Spreckels beet sugar factory, at Watsonville, Cal., has just started up, and is expected to turn out 8,000,000 pounds of sugar this season. A rival factory is in operation at Alvarado.

Trade between New Orleans and Mississippi River towns has been very much interfered with by the steamboat quarantine.

The report of the special Park Commission for the appraisal of lands to be taken in this city and Westchester County for park purposes is now on file and shows that the city is called upon to disburse \$9,592,000, including \$239,860 to defray the expenses of the commission.

The manufacture of big guns at Watervliet arsenal, under the appropriation of \$700,000 by the Federal Government for this purpose, will not commence sooner than a year hence, but the buildings will be put under contract in the spring. Col. J. M. Whittemore, the officer in command, says the guns to be made under the new arrangements will vary in weight from 15 to 50 tons. At present 28 men are employed at the foundry. They will turn out annually one 8-inch and one 10-inch seacoast gun and 25 field pieces. The 10-inch gun now constructing will, it is expected, at its best elevation, throw a ball or shell from eight to nine miles. Referring to the cost of the big 15 and 50 ton guns Col. Whittemore said the cost of turning out such work, not including the cost of steel and other material, was estimated to be \$1000 per ton. The \$700,000 appropriation does not include the making of any guns whatever. That sum is to be expended in building the necessary plant for the construction of 8, 10 and 12-inch guns.

A firm of ship agents in New Orleans have furnished some interesting information showing how money is left in that port by every ship that goes there. The figures are from actual accounts of vessels. The disbursements of the steamship for Queenstown, 1216 tons net, loaded with 86,245 bushels of corn, in April last, were

\$1500.19, on a total freight bill of about \$11,000. The expense account of a British steamship of 1176 tons net, loaded in May with 4800 bales of cotton, footed up \$7860.35 out of a total freight bill of \$13,639. All this was left in New Orleans, except \$2400 for compressing, that having been done in the interior. The expense account of a steamship of 1764 tons net register, loaded in January, 1888, with 207 tons oil cake, was \$3018.91 out of a freight bill of about \$10,000 or £2117. Of the last named case, \$1058.50 was for the stevedore. In the second case, the ship loaded with cotton, the stevedore's bill was \$2401. In the case of the Queenstown the stevedore's bill was \$525.

The annual meeting of the National Board of Steam Navigation will take place at New York, October 23, instead of Pittsburgh, as originally intended. The change was made after consultation with several of the Pittsburgh members.

The North Georgia and Alabama Mineral and Industrial Exposition, opened in Rome during the quarantine panic, has proved highly successful. The exposition will continue until the 13th inst.

The losses by the floods in Mexico are officially estimated at \$3,000,000.

Detroit papers complain that the local authorities are obstructive in their treatment of the proposal to supply the city with natural gas. One of the editors says "the manufacturing interests of the city demand cheap fuel, and the general interest of the city call for compliance with that demand." The argument is that Detroit must have natural gas in order to keep pace with her rivals.

The village of Gloversville, N. Y., has 120 glove manufactories, and Johnstown, in the same neighborhood, 55 more, all employed in working up sheepskin, popularly called "dog skin," together with a small quantity of imported skins, such as the kid and chamois. The annual production has increased to between \$6,000,000 and \$8,000,000. The manufacturers have always been quick to protest against fraudulent valuations at the Custom-House.

Norway will be represented at the International Marine Conference, to be held in Washington city in April next.

There is reason to believe that Alonzo Lewis, a traveler for the firm of W. & B. Douglas, manufacturers of pumps, in this city, is the victim of an atrocious murder. His life is supposed to have been taken by negroes, a few miles from Norfolk, Va., to obtain his money.

The Cleveland, Ohio, Board of Industry has collected statistics which show that the sales and products of crude oil in that city during the year reach the very large aggregate of \$20,000,000, of which \$6,000,000 represents sales of crude for fuel, 10,000 barrels a day, mostly shipped to the Middle and New England States.

The Toronto *Globe* congratulates the people of that city upon the moderateness of the municipal debt and their ability under the law to increase it for any proper purpose. The present debt, it appears, is only \$9,000,000, and it can be increased to \$11,000,000 without violating the restrictive statute. The interest on such a debt at 3½ per cent. would be \$385,000, or \$2.57 per head per annum for the population of the city, estimated at 150,000.

The enormous land transactions of the Union Pacific Railroad appear from the annual report of the Commissioners of Railroads which shows that on December 31, 1887, the company had disposed of 12,944,781 acres of land, the total cash receipts from all sales amounting to \$26,395,951. There remained outstanding on account of time sales the sum

of \$13,538,861. The average price per acre for all sales was \$2.53 for the Union division, \$3.72 for the Kansas division and \$4.24 for the Denver division. The revenue of the road for the year aggregated \$25,129,515 and the expenditures \$19,297,981, leaving a surplus of \$5,831,534. The debt of the company was \$222,169,431, and the assets amounted to \$266,451,137.

The contractor for the Museum of Natural History in Central Park has commenced work.

The validity of speculative contracts was involved in a decision recently rendered by Judge Holmes, of the Supreme Court of Massachusetts, and is a subject appropriate to the times. The loser in the transaction sought to avoid his obligations on the ground that the dealings in question were contrary to public policy and to the law against gambling. Judge Holmes decided against this view, holding that any party has a right to go into the market and make valid contracts, either for purchase or sale of property to be delivered at any future time, with the understanding and agreement between principal and broker that the property purchased may be resold before the day of delivery arrives, and thus settled by mutual adjustment of the two contracts, or receive upon the contract of purchase and deliver on contract of sale, and that there is no rule of law prohibiting such method of carrying on speculative operations.

The corn crop, which is now past all danger, is by far the largest ever harvested in the United States. It will certainly exceed 2,015,000,000 bushels, an increase of not less than 550,000,000 or 600,000,000 bushels over last year's crop. This fact is full of significance as concerns the general business interests of the country. With such a yield of corn the farmers are sure to receive \$200,000,000 more for their crops than in 1887, and that goes a long way toward insuring the prosperity of all classes and industries.

Gibb Ross, a large shipowner and lumber merchant, died at Quebec last week, leaving a fortune estimated at \$10,000,000. He owned 45 sailing vessels, over 100 square miles of timber lands and immense blocks of real estate. He was the largest shareholder in the Quebec & Lake St. John Railroad and was the promoter of a scheme to bridge the St. Lawrence at Quebec.

The last brick in the big chimney of Clark's Thread Mills in Kearney, N. Y., was laid 5th inst, and the American flag was hoisted at the top, 335 feet above the ground. It contains 1,700,000 bricks and was begun 150 days ago. The flue is 11 feet in diameter.

The merchants constituting the Chicago Freight Bureau have not abandoned their proposed war on the transcontinental roads for discriminating in freight rates on Pacific Coast business, but no action will be taken until after the meeting of the Transcontinental Association, 15th inst.

Mr. Leary will construct no more big rafts for ocean navigation, as the work of building and then breaking up such great rafts, to say nothing of transportation, creates an expense greater than that of handling the logs by vessels in the ordinary way.

In the race for industrial supremacy Japan is pushing far ahead of China. It was stated some time since that Japan supplies China with cotton-ginning machines, capable of being driven either by water or steam-power. The English Consul at Hiogo now states that an attempt is to be made to manufacture cotton-spinning machinery also, though he is not sanguine as to the early success of the attempt.

Ozaka, where these machines are made, is becoming an important industrial center. It has cotton mills and other factories, chemical works, dye works, &c. In other towns of Japan similar industries are being established. Railways are being built, steam shipbuilding is being carried on with considerable success, and in general terms it may be pronounced that Japan has made a creditable effort to place herself in line with the advanced civilization of the Western nations.

Senator Cullom expresses fear that the bill to amend the Interstate Commerce law will fail, owing to the difficulty in securing a conference in the absence of members of the committee.

Machinery of American manufacture forms a large part of the cargo of the clipper San Joaquin, now loading at this port for Australia.

According to the estimates made by the Finance Committee, the Senate Tariff bill provides for a total reduction of about \$75,000,000, made up approximately as follows: Sugar, \$27,759,000; free list, \$8,500,000; tobacco (internal revenue), \$24,500,000; alcohol, in the arts, \$7,000,000; other reductions in customs, \$8,000,000.

The Metropolitan Phonograph Company have filed their certificate of incorporation in Queen's County. The capital stock is \$1,000,000. It is organized for a term of 50 years. Victor E. Burke, of New York, and A. L. Taylor and Timothy Cornwall, of Brooklyn, are the incorporators.

In accordance with a provision inserted in the River and Harbor law of this year, the Secretary of War has designated the following officers to constitute a board to establish harbor lines at the port of New York: Col. H. L. Abbott, Col. W. P. Craighill, Col. C. B. Comstock, Lieut. D. C. Houston and Lieut.-Col. W. R. King, all of the Engineer Corps. The Secretary is authorized to establish lines beyond which no piers shall be extended or encroachments allowed. Gen. Casey, chief of engineers, is of the opinion that the piers on either side of the city are within proper limits, but the improvements on the New Jersey side demand immediate attention. The new law is not designed to interfere with the lines established by the harbor commissioners. Those interested will have an opportunity to be heard.

A fine specimen of ironwork, called the new Central Viaduct, is approaching completion in Cleveland, Ohio. The object is to make a crossing over "the Flats," and the contract was taken by the King Iron Bridge and Mfg. Company. The length of the Cuyahoga Valley portion of the bridge is 2838 feet and 6 inches; its height above the river is 101 feet and the span just put in place is 33 feet above the Nickel-Plate tracks. The draw span over the river is 239 feet long. The cantilever trusses are each 135 feet in length and 20 feet in depth, the long arm being 75 feet and the short arm 30 feet long. It will require another month to complete the ironwork.

The movement of the Mormons into Mexico has assumed large proportions and several flourishing colonies have already been established in the valley of the Casas Grand River. A counter movement is the remarkable migration of Mexicans from Sonora into Southern Arizona and New Mexico as far east as El Paso.

It has been rumored in telegraph circles the past week or two that the owners of the Delancy multiplex system were showing much activity, but these reports did not receive attention until it became known that the Standard Oil Company and a number of the heavy representatives of the Pennsylvania road were interested

in a new telegraph company who were in possession of certain valuable patents which would reduce the cost of maintaining electrical communication to less than one-half of the present rate. If the multiplex as at present improved will do half what is claimed for it, it is already proclaimed that a revolution may speedily be looked for in the business of telegraphic communication. It is the purpose of the new company to pay particular attention to commercial transactions between the principal centers of traffic. At night it is proposed to lease wires to the big dailies at \$2500 a year.

Turk's Island, in common with Cuba, suffered severely from a hurricane, 2d ult., and 400,000 bushels of salt were ruined. In Cuba the press in general advocates for the free introduction on the island, during a certain time, of all sorts of implements, machinery and apparatus used on sugar estates.

The New York Chamber of Commerce is divided in reference to the location of the new Federal building to be erected, and the subject has been referred to a committee. Merchants who are well informed, in several instances favor the retention of the Custom House where it is, with an enlargement, and the construction of an appraiser's building alone.

Alarm is felt on account of encroachments on the water space of New York harbor by private parties, who are filling in extensive areas on the Jersey shore, now covered by water at all stages of the tide, and the New York Chamber of Commerce petitions the Secretary of War to take such measures as shall prevent serious permanent injury to the channels at the harbor entrance, as the natural dredging process now in operation is liable to be affected if the outflow of water is retarded.

The sum of \$2,000,000 has been obtained wherewith to build a big bridge between Martin's Ferry and Wheeling, and work will begin at once. The bridge will be 2000 feet long, 90 feet above low water, and built with all "through" spans. The outside estimate of the bridge to be constructed over the Mississippi River at Memphis, by the Fort Scott system, is placed at \$3,000,000.

According to a statement of dividend payments by prominent New England cotton manufacturing corporations, that industry just now is enjoying an almost unprecedented prosperity. Thirty-two concerns paid dividends of \$1,386,190 on a total capital stock of \$17,108,000, an average of over 8 per cent. the first year. One company pays 25 per cent., seven pay 10 to 16½ per cent. and twelve 6 to 9 per cent. In addition to this showing, most of the mills have been enabled to largely reduce their debt.

The vast preponderance of the internal commerce of the United States, as contrasted with our foreign trade, was forcibly illustrated by Hon. Arden Speare, President of the Boston Chamber of Commerce, in an address delivered last week. He said: "The value of the products carried by our railroads alone in 1887 was \$13,043,250,000, or eight times as much as both imports and exports for that year, and the increase of this internal commerce for 1887 was \$1,660,000,000, or nearly 2½ times as much as our exports that year." Including coastwise traffic, from which foreign bottoms are excluded, the contrast would be still more startling.

The steel cruiser Baltimore was successfully launched on Saturday, and, on Saturday next the steel gunboat Petrel will be launched from the Columbian Iron Works, at Baltimore. The boilers and engines, built from designs furnished by the Bureau of Engineering, are all com-

pleted and will be put in place very soon after the ship is launched. The Petrel is of about 885 tons displacement.

The annual report of the Commissioner of the General Land Office to the Secretary of the Interior contains a statement showing that during the last four years a total of 83,158,990 acres have been restored to the public domain, and over 65,000,000 are recommended for restoration.

The resignation of T. B. Barry from the General Executive Board of the Knights of Labor is the third resignation among the general officers of the Knights of Labor within a few months. The first to go was General Secretary Litchman, and, after him, A. A. Carlton, a member of the board, who resigned last week. In parting Barry launches a bitter shaft at Mr. Powderly.

Thomas Hamilton, a successful wire manufacturer of Philadelphia, died suddenly on Saturday evening in that city, of heart disease. He was 68 years of age.

Justice Brown, of the Supreme Court, sustains the constitutionality of the McEvoy Grain Elevator bill.

Fine Magnetites in the Blast Furnace.

In response to an inquiry from the editor of the *Journal of the Charcoal Iron Workers*, E. S. Moffat, general manager of the Lackawanna Iron and Coal Company, Scranton, Pa., sends the following:

My experience has been chiefly with concentrated Chateaugay (Lake Champlain) ore, and we had so little trouble with it that I feel almost justified in saying that I do not know of any difficulties in its use, up to, say, 50 per cent. of the ore mixture, which is the most I have tried. We used some 10,000 tons of concentrated Chateaugay ore in our Scranton furnaces in 1887, and expect to use a much larger quantity this year. For the past two months (June and July), we have been running the four Scranton blast furnaces, which are in operation, on one-sixth concentrated Chateaugay ore. They have worked just as well as when we were using ordinary furnace ores, no increase of pressure, no irregularities and no trouble of any kind. A few days since I doubled the quantity of concentrated ore in use on our No. 1 furnace (73 feet high x 20 feet bosh), running it up to one-third of the ore charge. The only other change made was a slight decrease of limestone. The speed of the blowing engines and all other conditions being kept the same as before. I rather expected some increase of pressure at the tuyeres, but such has not been the case. The furnace was working well before the change was made, and has worked just as well since. No increase in pressure of blast. No decrease in the number of charges per day and no irregularities of any kind. The fuel used is one-fifth coke and four-fifths Lackawanna anthracite.

During 1887, we ran our No. 5 furnace (70 feet x 19 feet) for several weeks on 50 per cent. concentrated Chateaugay ore. When we made this trial I anticipated a considerable increase in pressure of blast, and in order to meet this increased the proportion of coke to one-third. I afterward concluded that this increase of coke was unnecessary, as the pressure of the blast went down considerably. The furnace worked well on 50 per cent. concentrated ore and showed no peculiarities. None of the concentrated Chateaugay ore is coarser than what will pass through a ¼-inch hole, and most of it very much finer. As different blast furnaces work differently, I would recommend parties commencing the use of concentrated magnetite to try a small proportion at first, say, one-twelfth, and then gradually increase.

MANUFACTURING.

Iron and Steel.

In answer to a report that the Glendon Iron Company, of Easton, Pa., were about to blow in a number of their idle furnaces, we received the following advices from the company, under date of the 4th inst.: "We are repairing two furnaces and have taken on what men were needed. We expect to blow in when ready. We are not booming very much, only shaking off a little of the dust which accumulated during idleness."

The condition of affairs at the various industrial establishments of Norristown, Pa., is reported to be highly satisfactory at the present time. Under date of the 5th inst. we are in receipt of the following advices from that place relating to improvements and changes which have recently occurred: "There is every indication that within a few weeks all the iron mills and furnaces in Norristown will be in active operation. Lucinda Furnace has been overhauled and its capacity increased. It will be put in blast at once. Last week James Hooven & Son dissolved, the senior partner remaining in the business, and on Tuesday the works resumed operations in all departments. A force of men is at work making alterations in the old and abandoned mill of the Standard Iron Company, which is to be fitted for the use of the Steel Car Wheel Company, organized recently. The company, it is said, will commence operations soon. The Stony Creek Iron Works have also resumed."

According to a recent issue of the *Sharon Herald*, the amount of money paid out as wages each month at the following named industries of New Castle, Pa., is as follows: Johnston's Sheet Mill, \$20,000; Etna Iron Works, \$20,000; Witherow's Works, \$12,000; New Castle Wire Nail Works, \$10,000; Crawford Iron and Steel Company, \$6000; Oliver Bros. & Phillips, \$5000; Baldwin & Graham's Stove Works, \$4800; Etna Furnace, \$4000; Raney & Berger Furnace, \$4000; New Castle Paper Mill, \$1000; total, \$86,000.

On Wednesday, the 3d inst., the head of the blast cylinder at the blast furnace of the Benwood Iron Works, at Martin's Ferry, Ohio, blew out. It will take a week to repair damages.

One of the Pittsburgh papers recently published a long statement to the effect that J. Painter & Sons, the well-known iron manufacturers of that city, had decided to abandon the manufacture of cotton ties, the reason given being inability to realize a profit owing to the low tariff on that product, which admitted of foreign competition. The facts in the case are, that the firm discontinued the manufacture of cotton ties several years ago, and have since been engaged almost exclusively in the manufacture of hoop iron.

It is stated that the Bethlehem Iron Company, of Bethlehem, Pa., have been compelled to close down a portion of their rail mill owing to inability to deliver steel rails ordered by Southern companies because of the yellow fever. No vessels can be chartered for the South until the yellow fever has abated.

James P. Witherow, engineer and contractor, of Pittsburgh, has just completed the erection of a pipe works for the West Superior Steel Company, at Duluth, Minn., which has a capacity for producing 200 tons of cast-iron pipe daily. The foundation has already been laid for a blast furnace to have a capacity of 200 tons per day, work on which has been suspended until spring next year. At that time will also be commenced the erection of a Bessemer steel plant, for which Mr.

Witherow also has the contract. The West Superior Steel Company is mainly composed of Western railroad men, and when their buildings are completed, which will be during the summer of next year, they will have one of the largest iron and steel manufacturing plants in the West.

Eliza Furnace, Eliza Iron Company, Wellston, Ohio, blew out last week, and will remain idle for at least the winter months.

Lucy Furnace No. 2, of Carnegie, Phipps & Co., Limited, at Pittsburgh, which has been out of blast for some weeks, will resume operations about the 15th inst. During the stoppage the furnace was relined and otherwise repaired.

The Forsman Malleable Iron and Cast Steel Company, have been organized at Louisville, Ky. The capital stock is \$30,000, and they will soon erect a foundry for making malleable or soft steel castings.

The Mayville (Wis.) furnace expects to be in active operation by the 10th inst.

Announcement is made that the Jefferson Iron Works, of Steubenville, Ohio, have decided to commence the erection of an additional blast furnace at an early date. It will probably measure 75 x 17 feet, and have a capacity of about 175 tons per day. It is expected the contract will be let in a few days and work be commenced on the furnace as soon as possible.

Star Furnace, Star Furnace Company, Jackson, Ohio, which banked in August for repairs, blew in October 1 after a thorough overhauling.

We are informed by Lean & Blair, engineers and contractors, of Pittsburgh, that the 20-ton Lash open-hearth steel furnace which they erected some time ago at the works of the Standard Steel Casting Company, at Thurlow, Pa., is working very successfully with producer gas, making heats in seven hours. The erection of this furnace to run on producer gas was an experiment, as all other furnaces erected by Lean & Blair are running on natural gas. The complete success of this experimental furnace leaves no doubt but that the Lash furnace can be operated with producer gas with as good results as when natural gas is used. Messrs. Lean & Blair have recently opened a branch office at 168 Washington street, Chicago, under the management of J. H. Reed & Co.

The new Gadsden Furnace of the Gadsden-Alabama Iron Company, at Gadsden, goes into blast the present week.

Miller, Metcalf & Parkin, the well-known steel manufacturers, of Pittsburgh, will add to their works a department for the manufacture of common steel. In the quality of their proposed new production the firm hopes to hold the same position they now occupy in the manufacture of fine steel.

The Keystone Rolling Mill Company, of Pittsburgh, are operating their plant double turn in all departments, except the plate mill, which is still idle. Pipe iron is the principal product.

No. 2 Sloss Furnace, Sloss Iron and Steel Company, Birmingham, Ala., blew in last week, and one of the North Birmingham furnaces will shortly follow suit.

The Jefferson Iron Works, of Steubenville, Ohio, has invited bids for the erection of a new blast furnace. It will probably be 75 by 18 feet, will have a capacity of about 150 tons per day, and will be operated in connection with the present furnace of the concern.

The new blast furnace now in course of erection by the Moorhead-McCleane

Company, of Pittsburgh, is almost completed, and will be ready for operation within the next 30 days. The stack is 90 feet high, while the bosh measures 18 feet. The cast house will be extended and a new stock house is to be built. A number of important changes are also being made in the rolling mill department by this firm. The blooming mill is being removed, and in its place a new train will be built. The blooming mill is thrown aside by an improvement, which dispenses with one process in converting the bloom into sheets. It is expected that a skelp mill and a merchant mill will be added to the establishment in the near future.

Fanny Furnace, at Shawnee, Ohio, operated by J. C. Hamilton, trustee, will resume operations in a few weeks. A new bosh has been put in, general repairs have been made, and a new brick casting house, 37 x 85 feet, is being put up to replace the old one, recently destroyed by a wind storm.

Copake Furnace, Copake Iron Works, Columbia County, N. Y., which shut down in August, has resumed operations.

The Prospect Rolling Mill Company, of Cleveland, have started business in the old Crucible Steel Company's Works, corner Garden street and the Cleveland and Pittsburgh Railroad. They will manufacture all grades of bar and horseshoe iron and steel tires. The capacity of these works will be about 60 tons daily. They have six furnaces, and they expect to have their works all in complete running order in 40 days.

No. 3 stack of the Phoenix Iron Works, Phoenixville, Pa., blew out on the 6th inst.

Sharon Furnace, at Sharon, Pa., formerly operated by Boyce, Rawle & Co., but purchased some time ago by Spearman, Colcord & Co., will in the future be known as Mount Vernon Furnace. It was put in blast last week.

The buildings for the plant of the Latrobe Steel Company, at Latrobe, Pa., will be made of wrought iron and will be fire-proof. The dimensions of the open-hearth steel department will be 250 x 80 feet. Connecting with it will be an L the same length and 40-foot span. The hammer-shops will be 350 feet long, with an 80-foot span, and will have an L the same length and 40-foot span. The company will manufacture tires for all kinds of wheels. About 300 men will be given employment.

The Detroit (Mich.) Iron Furnace was blown in last week.

F. R. Phillips, 407 Walnut street, Philadelphia, Pa., agent for the Solid Steel Company, Alliance, Ohio, reports the sale of a complete set of three-high solid steel nail plate rolls, 22 x 72 inches, to the Ellis & Lessig Steel and Iron Company, Pottstown, Pa.

Sheet mills Nos. 1 and 2, of Howe, Brown & Co., Limited, at Pittsburgh, commenced running 24 hours per day last week. The extra hours of work are rendered necessary by a large number of orders which the firm have recently received.

The Cleveland Rolling Mill Company, of Cleveland, Ohio, have purchased the barbed-wire plant of Billings, Taylor & Co., on Case avenue, and the machinery will soon be transferred to the mills of the company in that city.

The strike in the works of the Spang Steel and Iron Company, Limited, at Etna, Pa., near Pittsburgh, has been declared off by the Amalgamated Association. It commenced in July last when non-union men were employed in the Clapp-Griffith department of the works. The declaring of the strike off by the above-named

organization gives the firm a complete victory, as the only concession made by the firm was an agreement to take back as many members of the Amalgamated Association as places can be found for.

No. 1 furnace of the Cherry Valley Iron Works, Leetonia, Ohio, which has been idle for over a year, resumed blast on the 1st inst.

Machinery.

The partnership heretofore existing between Rees, Shook & Co., founders and machinists, at Pittsburgh, has been dissolved by the retirement of Levi Shook and W. G. Wilmot. The business will be continued by the remaining partner, Wm. M. Rees, at the old stand, No. 46 Water street, Pittsburgh.

The contract for engines, pumps and buildings at the Ridgewood pumping station, in Brooklyn, was awarded to the Washington Hydraulic Company, whose bid was \$198,471.

The Globe Foundry Company have recently been organized at Wellston, Ohio, with a capital stock of \$15,000. The new firm have purchased the foundry building recently erected by Spellacy Brothers, and will at once equip and put it in operation to manufacture all kinds of miners' supplies, such as cars, tools, &c., and make all kinds of engines, machinery, &c.

Eynon & Ingersoll, of Cleveland, Ohio, manufacturers of machinists' tools, are erecting a new works in that city on Lake street, 100x40 feet, three stories high, with an L on Kistland street 100x40 feet and two stories high. These buildings will be equipped with the latest improved machinery. The firm will carry on the manufacturing of milling machines, boring mills and shapers.

What is claimed to be the largest iron reservoir ever built is to be erected in Malden, Mass. The city has made a contract with the Cunningham Iron Works Company, of Boston, for the sum of \$20,940, to build a wrought iron reservoir to contain 1,158,000 gallons of water. It will be 75 feet in diameter and 35 feet high, and built of plate iron $\frac{1}{4}$ inch in thickness and of a tensile strain of 50,000 pounds per square inch of section.

The Erie Electric Motor Company, of Erie, Pa., have been granted a charter, with a capital stock of \$100,000. The shareholders are Wm. W. Reed and C. F. Allis, of Erie; S. T. Everett and E. B. Bangs, of Cleveland, Ohio, and J. S. Casement, of Plainville, Ohio.

The Shields & Brown Company, 240 and 242 Randolph street, Chicago, and 143 Worth street, New York, have just issued a very neat pamphlet illustrating and describing their sectional insulated air coverings for steam, gas and water pipes, drums, heaters, &c. The topics treated of are asbestos cement, asbestos materials, air-chamber coverings, elbow and valve coverings, economy of pipe covering, frost protective covering, hair-felt covering, train-pipe covering, &c. The method of constructing the different classes of coverings, and the manner of applying them, are very plainly illustrated, and the merits of the goods are set forth very convincingly. The pamphlet comprises 24 pages, tastefully covered with blue paper.

The Hill Clutch Works, of Cleveland, Ohio, are remodeling and greatly enlarging their plant, putting in new engine and boiler and considerable new machinery.

The Cochrane Roller Mill Supply Company, of Dundas, Ont., are rapidly completing their new works at Escanaba, Mich. They will have their own foundry for making iron castings. They expect to employ 1000 men when in full operation.

By a method which they have perfected they claim to be able to run a 200-barrel flour mill with a 7-inch belt in place of an 18-inch belt heretofore required for such service.

The September sales of boilers by the Babcock & Wilcox Company, of New York, amounted to 16,200 horse-power. This is probably the largest horse-power of stationary boilers ever sold by one firm in that length of time.

The Standard Tool Company, Cleveland, Ohio, are erecting new works on Garden street and C. & P. R. R. The main building will be three stories high and 165 feet long. There will be a separate boiler and engine house, with one-story building attached, 116 x 25 feet; also one-story office and warehouse, 85 feet long by 32 feet wide. The company do not expect to occupy the new works until the beginning of the year. The fact that their present quarters are inadequate for their increasing business is the reason for the erection of these new works.

Hardware.

The Anthony Wayne Washing Machine Company, Fort Wayne, Ind., are producing their well-known "Washer" at the rate of 40 machines per day, and the company are diligently at work upon patterns for a new Washer, which, it is expected, is to be put upon the market within the next 60 days. Their sales up to the present time, although only the second year of their organization, have reached over 8000 machines.

The Enterprise Mfg. Company, Akron, Ohio, under recent date, advise that they have just completed a two-story brick factory building, 30 x 60, and improved the two buildings already occupied by them, making in all three factories in their Akron plant, arranged so that each building is fire-proof, and giving a floor space of two acres devoted to the manufacture of their patented specialties. They are also putting in one Huyett & Smith Mfg. Company's largest size hot blast heaters to heat the different buildings and departments with hot air. Among the new additions to their line of goods is mentioned a sweat pad factory to their harness specialty department, possessing a number of improvements over other styles, particularly in the collar fastener device and for the cork filling used; the pad is medicated. A large trade has been worked up on these goods, while the trade on luminous goods is on the constant increase.

The Horton Mfg. Company, Fort Wayne, Ind., are turning out the Wayne Washing Machines at the rate of 80 per day. The trade on their Superb Corn Planter has been very fair. The company have made an addition to this useful device in the form of an interchangeable plate or disk for planting sorghum or broom corn seed when desired. The change can be made instantly.

We are advised that the Le Page Glue and Cement Company, Gloucester, Mass., have added to the plant twice during the year, and are now putting in a 5-ton digester, which, together with other improvements, will double their present capacity.

Miscellaneous.

In answer to a report that the Nimick & Brittan Mfg. Company, of Pittsburgh, had notified their employees of a 10 per cent. reduction in wages, to take effect on the 15th inst., we are advised that there is no truth in the rumor whatever. The report that a change would also be made in the management of the firm is likewise untrue.

A press dispatch from Beaver, Pa., under date of the 23d ult., says: "On account of the great diminution of the nat-

ural-gas supply of the Sheffield district, the Bridgewater Natural Gas Company have decided not to pipe gas to Youngstown, Ohio, hereafter, but to devote all their energies and capital to the Beaver Valley. The pipe line to Youngstown, laid two years ago at a cost of \$650,000, will be taken up and made to do service as a main from new wells which the company will drill.

T. William Harris & Co., 44 Broadway, New York, have been awarded the contract for extending the Dobbs Ferry and Hastings Gas Works. New pipes will be laid at both Dobbs Ferry and Hastings.

Licenses to incorporate under the laws of Illinois have been granted to the following companies: The Dieckmann Electrical Company, at Chicago; capital, \$100,000; for the manufacture of electric machines and apparatus; incorporators, G. F. Dieckmann, Christain Wahl and David Quigg. The United States Oil and Gas Stove Company, at Chicago; capital, \$100,000; for manufacturing; incorporators, E. B. Hamlin, H. J. Baker and J. B. Payne. The Lehner, Johnson, Hoyer Mfg. Company, at Chicago; capital, \$75,000; for the manufacture of metallic and earthenware goods; incorporators, J. H. Lehner, J. H. Johnson, F. A. Hoyer, T. M. Kent and C. D. Street. The Montague-Woodrough Saw Company, at Chicago; capital, \$50,000; incorporators, G. Montague, R. L. Woodrough and H. A. Leland. The Steele Heater Mfg. Company, at Chicago; for the manufacture of all kinds of machinery and appliances for lighting and heating; capital, \$1,500,000; incorporators, Wilbur F. Steele, William Grimshaw and J. M. Labold. The Tubal Cain Brass Mfg. Company, at Chicago; capital, \$75,000; for the manufacture of brass, iron and copper goods; incorporators, J. H. Lehner, J. H. Johnson, F. A. Hoyer, T. M. Kent and C. D. Street. The Cumberland River Iron and Mfg. Company, of Chicago; capital, \$1,000,000; incorporators, William A. Gardiner, Frank B. Dyche and Frank F. Reed. The Chicago Steel Rail Company, of Chicago; capital, \$200,000; incorporators, Samuel W. Adams, John Good and William A. Hinkins. The Seamless Fibre Ware Company, of Chicago; capital, \$20,000; incorporators, L. C. Rigg, Eber Hubbard and Chas. S. Burton.

We are informed that the Cleveland Silver Metal Company, Cleveland, Ohio, are intending to offer at public sale their whole franchise, including factory, machinery, tools, &c. The company began business about one year ago, manufacturing a new white metal, which they termed "silver metal," in sheets and bars for the trade, and also a line of spoons and forks from this metal, which were put upon the market under the brand of "Silver Metal." The factory is a two-story frame building, 35 x 120 feet, boiler-house one-story frame, 32 x 28 feet, with stone floor, containing one 45 horse-power engine and two boilers; also annealing-house, 32 x 28 feet, and annealing furnace, foundry, one story, 36 x 31 feet, 40-foot brick stack and seven furnaces. The factory is heated by steam, and has the modern conveniences in the way of machinery, &c., for making spoons, forks, &c. The convenience of the location and the fact that the plant is in good order and offered on favorable terms are alluded to.

Recently an axle specification was given out which was particularly rigid. A specimen, $\frac{1}{4}$ inch x 1 inch, cut from the finished muck axle, was to show a tensile strength of 49,000 pounds, an elastic limit of 26,000 pounds, and an elongation of 15 per cent. in 8 inches. A specimen must bend cold 180° to a curve, the inside diameter of which is $2\frac{1}{4}$ times the thickness of the piece.

The Iron Age

New York, Thursday, October 11, 1888.

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GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Uniformity in Railroad Classification.

The letters of Chairman Cooley to our Western railroad managers, which we noted in our columns last week, bear upon a subject of importance to all shippers of freight. An amendment to the Interstate law has been introduced into the House, making it compulsory upon the Interstate Commission to arrange a uniform classification for the whole country. This, with other proposed amendments to the Interstate act, is not likely to become law this session, but it emphasizes the chairman's reasoning that unless the railroads make more efforts in this direction, Congress will take the matter into its own hands.

The present confusion in our practice is the source of much annoyance to manufacturers and merchants. As it now stands a shipment to any point outside the bounds of a traffic association is governed by one classification within those bounds and by another and very different one beyond. A through rate under these circumstances is a matter of some little difficulty, whereas such knowledge should be within easy reach of shippers. Because the fourth-class rate is known from shipping point to destination it does not follow that this is the real rate upon an article, because of differing classifications. Thus we have the Official, the Western, the South railway and steamship, the Illinois, the Texas, the Transcontinental classifications, while any merchant's shipments may run into two or more association territories. In these days when the transportation charges make so large a part of the value of an article, such uncertainty is a grave obstacle to perfect commercial freedom and distribution.

On the other hand, the present condition of things is an outgrowth of our national circumstances. Much of the classification confusion previous to April, 1887, was unnecessary, but complete uniformity can be obtained only by the sacrifice of other advantages. The extent of our country is such that we find the greatest diversities in production. In agriculture, Arctic wheat and tropical fruits demand attention; coal mines and ore beds are widely separated. These must be brought together and their exchanges arranged for by our railroads. Thus the classification of oranges and melons is a matter of vital interest to one section, while another has its attention fixed solely on manufactures. It would be unjust to apply the low rate made on coal by the great coal-carrying roads of Pennsylvania to the Western lines. Rigid uniformity is indeed desirable, but the question is an important one whether the shipping public are ready for the readjustment and the consequent leveling up which would take place. Each article would take an average place, a mean between the low classification of our section and the high of another. While if some

particular article should clearly take a lower rate than that given to it, the railroads might, with a show of justice, say that they could not put this article in a lower classification, because other sections of the country, not interested, objected; nor could they reduce the rate itself because it would apply to all the items in that class, many of whom did not need any reduction. It is easy to see how many established interests would be affected, while it is a question whether the shipping community would as a whole be one whit better off, for it may be set down as an axiom that our railroad men will try to secure their average net earnings in any event.

There is one loophole of escape—by a system of commodity rates, such as are made freely west of Chicago and such as we find in the official classification on iron and iron manufactures. Under this plan the general classification throughout the country would be made on the compromise system, while each section would obtain special rates on its special products by commodity rates. It is true that this would cause nearly, but not quite, the same annoyance as now, for no merchant could be sure of a through rate without consulting all the commodity exceptions, and we would thus be changing the form of our differing classifications, but not their substance; yet the gain though slight would be something. Every one could go through the exceptions more quickly than through a number of classifications.

If commodity rates should be forbidden and cast-iron uniformity be insisted upon, we look for many protests. The products of the different sections demand and should receive special consideration.

The Blast Furnaces on October 1.

The encouraging outlook for the pig-iron industry has had its influence upon the blast furnace capacity now actively at work. The anthracite furnaces are well employed, but show no marked increase over the capacity of September 1. A few more furnaces have begun work or are preparing to do so, among them the Charlotte, Glendon, Temple and Edge Hill, but it is likely that, on the other hand, some stacks now at work will be found to blow out for repairs. The coke furnaces exhibit greater activity and promise further increase.

Turning to the anthracite furnaces we have the following:

Anthracite Furnaces, October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	26	9	2,995	17	3,874
New Jersey.....	15	4	1,423	11	3,394
Spiegel.....	3	3	238	0	0
Pennsylvania:					
Schuylkill Valley.....	35	17	5,191	18	3,690
Lehigh Valley.....	48	26	9,130	20	4,756
Spiegel.....	1	1	43	0	0
L. Susquehanna Valley.....	23	12	5,078	11	2,642
Lebanon Valley.....	15	14	8,808	1	400
U. Susquehanna Valley.....	18	9	2,822	9	1,630
Maryland.....	4	0	0	4	462
Total.....	186	95	33,728	91	20,938

Practically, therefore, the capacity has remained stationary, nor have we any reports that indicate a notable increase for

the current month. For a year past our records show the following:

	Furnaces in blast.	Capacity per week.
October 1.....	96	33,728
September 1.....	92	33,541
August 1.....	93	33,397
July 1.....	92	32,478
June 1.....	99	32,418
May 1.....	96	31,003
April 1.....	94	30,496
March 1.....	98	28,568
February 1.....	97	29,989
January 1.....	118	38,206
December 1, 1887.....	122	39,487
November 1.....	124	40,028
October 1.....	123	39,440
September 1.....	125	38,338
August 1.....	129	37,930
July 1.....	138	40,742

Among the anthracite furnaces the only change in New York is that Charlotte may blow in this month. In New Jersey Musconetcong is running. In the Schuylkill Valley Lucinda and Edge Hill have probably begun work at this writing, while Mount Laurel, which is putting in a new bosh and lining, is expected to blow in between the 15th and 20th of this month, and Temple is preparing. In the Lehigh Valley Lehigh Furnace went out early in September. In the other districts there have been no changes at all.

The position of the coke furnaces on the 1st of this month was as follows:

The Coke Furnaces October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	3	1	982	2	1,832
Pennsylvania:					
Pittsburgh district.....	19	16	16,825	3	2,657
Spiegel.....	1	1	410	0	0
Shenango Valley.....	19	14	8,928	5	2,520
Juniata and Conemaugh Valley.....	21	11	6,045	10	2,340
Spiegel.....	1	0	0	1	200
Youghiogheny Valley.....	5	4	1,510	1	600
Miscellaneous.....	3	2	1,043	1	550
Maryland.....	2	1	250	1	120
West Virginia.....	6	3	1,783	3	1,083
Ohio:					
Mahoning Valley.....	14	11	8,071	3	2,140
Central and Northern.....	17	14	9,490	3	1,310
Hocking Valley.....	14	5	1,531	9	1,990
Hanging Rock.....	11	7	1,580	4	908
Indiana.....	2	1	174	1	249
Illinois.....	13	9	9,908	4	3,120
Michigan.....	1	0	0	1	250
Wisconsin.....	4	1	502	3	2,011
Missouri.....	6	1	436	5	2,136
Colorado.....	1	1	465	0	0
The South:					
Virginia.....	11	8	3,678	3	1,868
Kentucky.....	4	4	977	0	0
Alabama.....	17	13	6,955	4	2,680
Tennessee.....	10	8	3,474	2	897
Georgia.....	2	1	501	1	239
Total.....	207	137	85,461	70	22,630

	No. of furnaces.	Capacity per week.
October 1st, 1888.....	137	85,461
September 1.....	133	81,082
August 1.....	122	74,835
July 1.....	121	69,543
June 1.....	128	75,427
May 1.....	130	75,815
April 1.....	128	70,644
March 1.....	128	68,862
February 1.....	136	73,912
January 1, 1888.....	143	83,101
December 1, 1887.....	144	88,835
November 1.....	151	90,459
October 1.....	152	89,123
September 1.....	145	83,124
August 1.....	113	62,061

The increase is principally due to greater production in the Pittsburgh district, the Shenango, Youghiogheny, Allegheny and Mahoning valleys, Central and Northern Ohio and the South.

In New York Troy has blown out one of its furnaces. In the Pittsburgh district Clinton, formerly owned by Graff, Bennett & Co., has been started by the syndicate of creditors who purchased the plant some time since, and is making between 40 and 50 tons of iron per day. The repairs on Edith are almost completed, and it will be making iron in this month. Lucy No. 2 is expected to be ready on the

15th inst. It is believed safe to state that every furnace in Allegheny County will be in blast not later than November 15. In the Shenango Valley Florence is idle till November 1, but Rosena and Mount Vernon are at work. In the Youghiogh eny Valley Charlotte is at work and Rebecca has resumed. In the Mahoning Valley production is active, the output in September having aggregated 34,591 tons, Himrod, now leased to the Mahoning Valley Iron Company, having been added to the list. Among those furnaces grouped as those of Central and Northern Ohio, Seneca is at work, and Cherry Valley No. 1 is probably now blowing. In the Hanging Rock Eliza has stopped for an indefinite period and Alice is out. Star, which was banked during September, is running again. In the Hocking Valley Crafts began work on the 5th ult. In Wisconsin Mayville is probably blowing at this writing. In the South No. 2 Sloss has resumed, and one of the new North Birmingham stacks is to be lighted at an early date. In Tennessee Sewanee has resumed, while one of the South Pittsburg furnaces has blown out.

Growth of Lake Commerce.

The shipping interests of the country are not dead. On the contrary, the latest statistics of the Commissioners of Navigation afford gratifying evidence of a revival. But the improvement is mainly in the commerce of the great Northern lakes, where iron shipbuilding has received a strong impetus during the past year. The exhibit of the commissioners is as follows, for the first six months of 1887 and 1888, in comparison:

Comparative Statement of Number and Tonnage of Vessels Registered During the Six Months Ending September 1, 1888, and September 1, 1887.

STEAM VESSELS.			
Division—	1888.	1887.	
No. Tonnage.	No. Tonnage.	No. Tonnage.	
New England.....	25 5,647	21 4,188	
Mid. Atlantic and Gulf.....	79 13,335	71 20,964	
Pacific Coast.....	44 10,026	32 4,113	
Northern Lakes.....	120 82,550	71 49,224	
Western Rivers.....	44 6,004	42 5,872	
Total.....	312 117,612	237 84,362	
SAILING VESSELS.			
Division—	1888.	1887.	
No. Tonnage.	No. Tonnage.	No. Tonnage.	
New England.....	65 12,796	58 10,877	
Mid. Atlantic and Gulf.....	130 3,302	130 4,206	
Pacific Coast.....	39 6,790	24 3,734	
Northern lakes.....	35 9,610	22 2,055	
Total.....	269 32,498	234 20,872	

Taken as a whole the foregoing is cheering and full of encouragement. To most readers it is a revelation, the average tonnage having increased during the six months covered by the statement from 105,234 tons in 1887 to 150,110 tons in 1888, or at the rate of about 33 per cent. per annum, and the aggregate number of vessels rises from 471 to 581 in the period mentioned. The most notable fact, however, is the increasing activity on the lakes, as appears from the following statistics of the number and tonnage of vessels built on the lakes for six months, ending September 1, 1888 and 1887:

	1888.	1887.	
No. Tonnage.	No. Tonnage.	No. Tonnage.	
Steam vessels..	120 82,550	71 49,224	
Sailing vessels	35 9,610	22 2,055	
Totals.....	155 92,160	93 51,279	

Hence it follows that of the total increase of 110 vessels, of 44,876 tonnage, not less than 62 vessels, of 40,881 tonnage, was in

the lake department. Shipbuilding on the Pacific Coast meanwhile more than doubled. On the other hand, in the middle Atlantic and Gulf divisions there was a heavy decline.

At the present juncture a cursory review of the principal facts relating to the important traffic springing up on our northern border is not inopportune, especially while our commercial relations with Canada are under discussion, and while Congress is making further appropriations for the improvements at the gateway of Lake Superior, known as the Sault Ste. Marie Canal and the St. Clair Flats. The tonnage employed on the chain of Northern lakes, stretching from the Atlantic to the heart of the continent, as we have seen, is expanding by leaps and bounds. From New York to the head of Lake Superior is 1400 miles, and beyond is the vast agricultural region under the British flag, nearly 1000 miles square and capable of a boundless production of cereals, which is forming connections with the American railway system, and will contribute to the volume of commerce passing through the lakes, steadily augmenting as the years roll on. Although the Canadians have expended about \$40,000,000 on public works, exclusive of the \$100,000,000 or upward absorbed in building the Canadian Pacific Railway, confident of their ability to control the traffic of the Northwest, it is found in practical experience that "the up-cargo is the life of the trade." In other words, vessels navigating the St. Lawrence River are unable to command the cargoes of coal from the States, and other miscellaneous merchandise for the westward trip which are essential to a profitable voyage in conjunction with the coal and ores received in return. Herein it would appear there has been a serious miscalculation. One writer says: "The Canadians have spent about \$40,000,000 in digging canals to accommodate this traffic, and still it resolutely refuses to go down the St. Lawrence River. They can fling \$50,000,000 or \$150,000,000 additional, if they can borrow so large a sum from credulous Englishmen into their canals and river improvements, and they cannot divert one bushel of grain from Buffalo, the Erie Canal and New York."

The growth of the traffic on the basis which now seems to have become established is marvelous. In 1855, when the first lock at Sault Ste. Marie was opened for business, 100,000 tons of iron ore and copper passed through, and five years later the amount was increased to 400,000 tons. In 1875 the amount was 1,260,000 tons, supplying one-third of the ore for the total pig iron production of the United States, and the necessity for another structure of larger capacity for the accommodation of traffic was clearly demonstrated. The additional lock now in use, a noble specimen of engineering, 575 feet in length, was opened for business in 1881, and it was calculated that the saving in the cost of iron ore transportation alone, from Lake Superior was \$800,000 in the following year. Seven more years have passed and again there is a demand for enlargement. Works at the present time only fairly begun are estimated to cost nearly \$5,000,000, exclusive of a dry dock in contemplation.

A recent special report by Gen. O. M. Poe, relative to the St. Mary's Falls Canal,

shows that 5,494,649 tons of freight passed through it last season, and that the freight charges amounted to \$10,075,153. The charge by rail would have been as \$11 to 183, effecting a saving of \$34,557,140 for the single season, or fully \$40,000,000 if freight rates were raised to where they naturally would go if it were not for the water route. It would be difficult to set bounds to the ultimate growth of the trade of the Northwest. Is there no hope that our ocean marine will share likewise in the prosperity of the great republic?

Coke Pig Iron at Chicago.

The coke pig-iron trade of Chicago has recently fallen largely under the control of local producers from a variety of causes. When the demand for steel rails was very active, the Chicago rail makers absorbed not only the entire production of their own blast furnaces, but they also placed contracts for Bessemer pig iron with outside furnace companies at Chicago and other points within reach, even purchasing charcoal pig iron in excess of the quantity they were required to use in making rails for some of their most exacting customers. This year the condition of the Western steel trade has so changed that comparatively little Bessemer pig iron has been purchased from outside producers, and some of the furnaces connected with rail mills have been turned on pig iron for sale. The local supply of foundry and mill pig iron was thus so augmented that for a time the price of coke pig iron in Chicago was relatively lower than in any other Northern center of consumption. The low price then established was continued for some time, after the demand for pig iron in other localities had considerably diminished the quantity of competing iron offered at Chicago, thus giving the local producers a still stronger hold on their home market. Notwithstanding the increased production of foundry and mill pig iron at Chicago and in its vicinity, by the furnaces formerly largely employed in making Bessemer pig iron and the new Mayville furnace in Wisconsin, the consumption is now sufficiently heavy to absorb all of it, and to enable the producers to mark their prices up, so that they are more nearly on a par with the competing iron from other sections. Soft coke pig iron, of course, retains its hold upon the Chicago market, not being disturbed by the native product, but other coke irons certainly appear to be almost shut out, and will continue in that condition until either the steel-rail trade resumes its old-time activity, or their prices are forced much lower than now seems probable. The advantages presented by Chicago for the location of blast furnaces to make pig iron for the general market were never so thoroughly established as they have been by the recent events herein set forth. With the constantly growing consumption of iron in that city and its tributary country, it will be remarkable if the number of blast furnaces is not increased in the early future.

Attention is directed every now and then to the use of steam as a means of extinguishing fires, and its advantages, in point of convenience and efficiency, over other methods, are frequently given prom-

inence. As a matter of fact, however, some of the conditions essential to success are, by some, persistently ignored, and it is not surprising, therefore, that there should be instances where the method has failed completely. In order that it may be successful the space in which the fire is burning should be inclosed, so that free access of air should be cut off, and steam under pressure and in ample quantity should then be let into the apartment. The efficiency of the steam in extinguishing the fire is easily explained, being due to the fact that the vapor displaces the air, and, with it, the supporter of combustion, atmospheric oxygen. If these circumstances were given due weight there would be less disappointment and fewer heavy losses where steam jets are depended upon for fire protection. A year or two ago, we believe, reports of experience in Germany with the steam-jet method recorded decidedly unsatisfactory results and inquiries were frequent as to the exact conditions under which it was practiced in American mills, where it was known to have done very good service. The whole secret of success, however, if such it be, is in the correct application of the principles which we have stated.

The Position of Tin.

On June 27, the lowest price for Tin after the collapse was reached in the London market, £75. 12/6, and in our own, 17 cents. Since then the tendency has been gradually upward, till on September 18th London had risen to £104. 15/, and New York to 23½ cents. Then a downward course set in, depressing London to £100 last week, but recovering at the close to £101. 5/. The extreme advance during the short period of 83 days had consequently been nearly 40 per cent. Great impetus was given to the demand by the reduction in price after the speculative boom came to an end, and on the other hand there is a prospect of more abundant supplies. It would appear, therefore, that the price of £100 is quite high enough, if not too high, to be justified by the actual situation. The statistics of October 1, indeed, proved to be by no means favorable; the visible supply in Europe and America had been reduced but little during September, being 12,451 tons on October 1 as compared with 12,740 on September 1, and 11,907 on October 1, 1887. Apart from speculative causes, the subsequent return to £100 was, therefore, nothing but natural. In our own market the decline in London has exercised but little influence, available tin being scarce, so that even a limited consumptive demand suffices to sustain the price of 23½ cents on the spot. At the considerably increased value a great impulse has been given to the output of tin in all producing countries, in the Straits, notably, but, on the other hand, the stocks in the hands of dealers have everywhere, it would seem, dwindled to a minimum; hence, even a more abundant supply from the East in the near future may be absorbed without much difficulty. Present values may be tolerably well sustained, unless operators for a fall, through manipulations of their own, succeed in temporarily engineering a drop of some moment.

September shipments from the Straits to this country were unusually large—750

tons, against 450 last year; to England they were 1300, against 1200 tons. Since January 1 they have been 15,900 to both countries taken together, as compared with 14,000 during the first nine months of last year. The opening of the wool season in Australia usually leads to freer tin shipments, hence from now forward larger amounts may be expected from that quarter, too. In Holland September commenced with the following stocks:

	1888.	1887.
Banca stock, slabs.....	147,036	99,170
Billiton ".....	13,468	14,333
Banca afloat ".....	4,000	2,900
Billiton ".....	45,000	47,000
Totals.....	209,504	163,403

As for the activity in general trade on this side, and the influence it may still have on tin between now and the close of the year, it may be believed that the bulk of the fall business has been done, and, the Presidential election drawing near, it will terminate after a couple of weeks. Nor can the last two months of the year be depended upon to bring much trade, either in tin or the metal branch generally. In Europe business is only fair. Any extraordinary amount of buying in any branch for actual consumption need not be expected during the last quarter of the year. Tin will therefore have to stand on its own merits. It is not overabundant in actual stock anywhere except in Holland, but the amounts afloat are liberal, and they would be too much so but for the light holdings of dealers. At £100 tin, under the circumstances, cannot be called cheap, but at the same time, in spite of the nearly 40 per cent. recovery, it cannot positively be called dangerously dear.

The statistics of production for the first six months of this year, just issued by J. S. Jeans, the secretary of the British Iron Trade Association, confirm the reports of an improvement in trade independent of a demand from this country. The output of pig iron for the first six months of this year was 3,902,804 gross tons, as compared with 3,773,812 tons for the second half of 1887 and 3,668,115 tons for the first half of 1887. Stocks have declined 41,615 tons, leaving them 2,673,860 gross tons, so that the apparent consumption, deducting exports, was 3,442,686 tons, as compared with 3,043,925 tons during the first half of 1887, an increase of 398,761 tons. The report covering the production of Bessemer steel ingots points in the same direction. For the first half of 1888 the output was 1,051,481 gross tons as compared with 915,554 tons in the first half of 1887, an increase of 135,926 tons, South Wales showing the greatest development—from 244,159 tons to 311,468 tons. The rail product developed little improvement, the increase being from 445,785 tons for the first half of 1887 to 487,174 tons in the first six months of the current year, so that, evidently, the greater demand for Bessemer steel was for miscellaneous shapes. This is confirmed by the extraordinary development of open-hearth steel, showing a growth of nearly 50 per cent. this year over last, the figures being 405,390 tons for the first half of 1887, and 616,421 tons for the corresponding period of this year. Scotland leads with 151,416 and 223,192 tons, respectively, the Northeast Coast following with 75,023 and 141,103 tons, South Wales with 80,290 and 131,703 tons.

It may be stated that Mr. Jeans reports that 223½ furnaces were employed, 47½ unemployed, and that 30 are under construction.

By way of comparison we may submit the following.

Production of Iron and Steel, Six Months, Gross Tons.

	United States.		Great Britain.	
	First half.	1888.	First half.	1888.
Pig Iron.....	3,043,295	3,020,092	3,668,115	3,902,804
Bessemer Steel Ingots.....	1,462,118	1,235,971	915,554	1,051,481
Bessemer Steel Rails.....	1,021,500	962,197	445,785	487,174
Open-Hearth Steel Ingots.....			405,390	616,421

We are not in possession of the statistics of open-hearth steel production for the periods under review. Possibly they might make an exception to the rule that there has been a falling off in this country where there has been an increase in Great Britain.

The British Admiralty has just issued regulations which, it is expected, will remove to a great extent the danger of serious explosions in the coal bunkers of vessels of the navy. In past years it was the practice, we believe, to conduct the coaling of British war ships from wharf stores which contained coal that had been for some months exposed to the action of the atmosphere, and which thus had been given opportunity to part with much of its gas. At the expense of using coal which had been allowed in this way to deteriorate, British ships enjoyed reasonable immunity from gas explosions, until more recently a number of accidents of this kind in quick succession, brought about very probably by a departure from the usual method of securing coal supplies, suggested the fitness of some inquiry on the subject. In the new regulations, accordingly, special stress is laid on the fact that in supplying ships the coal should be kept as dry as possible, moisture in some cases being conducive to a rapid development of heat and gas, and in washing down the decks after coaling the bunkers are consequently to be tightly closed. Attention is further directed to the necessity of maintaining good ventilation of the bunkers, and as a last measure of safety the use of naked lights in these is strictly prohibited unless the absence of gas has been definitely assured by direct test. With an efficient system of ventilation, and an even moderate exercise of care, it is difficult to explain why a serious explosion should occur, and future accidents will have to be inquired into chiefly with the view to exposing carelessness in management.

A Coke-Crushing Machine.—The J. M. Schoonmaker Coke Company, of Pittsburgh, have recently placed in one of their works in the Connellsville region a new coke-crushing machine, of which the following is a brief description: In place of the coke passing through a revolving shaft, as is the case with the coke crushers now in operation, with the new crusher it will pass over a number of screens so arranged that all the dust will be kept out of the coke. The different sizes will fall into bins ready for shipment, entirely free from any dust whatever. In passing over the screens and through them the arrangement is such that the coke will not be subject to the friction that is unavoidable in passing through a revolving shaft.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., October 9, 1888.

The Senate has at last launched its tariff bill upon the sea of discussion. An effort to limit general debate to ten days was declined by the Republicans, who, while they may not consume more than that amount of time, did not wish to bind themselves by agreeing to a fixed date. After general debate shall have ended, the consideration of the bill by paragraphs for amendment will consume much more time. The prospects of reaching a vote before the election are, therefore, not at all flattering.

It is most likely, on the authority of Senator Allison, that about the time the end of general debate shall have been reached the Senate will be willing to consider a proposition from the Democrats to take a recess. If at all, this time will be about the 25th of the present month. The Democrats are much divided upon the question of taking a recess. Speaker Carlisle said to-day that he supposed that everything was agreed to when he discovered that Representative Breckenridge and a few others were opposing the movement, and threatened to demand a quorum if an effort were made to force the passage of a joint resolution to either take a recess or to adjourn. Therefore, matters stand as they were a week ago, and will so remain for at least ten days, when the attempt to come to an understanding about getting away will be renewed.

The majority report of the Senate Committee on Finance is one of the ablest, most comprehensive and satisfying and instructive documents on the subject of the tariff which has been issued. It was under the personal supervision of the subcommittee, Messrs. Allison, Aldrich and Hiscock, assisted by the clerk of the committee, Benjamin Durfee, and the statistician and computer, Mr. Evans. The interesting comparative and statistical data conveys much valuable information. The following is a list of some of the manufactures which the Senate Committee charge would be seriously affected by the reductions proposed in the House bill:

Manufactures of cotton.
All manufactures of wool.
All manufactures of hemp, flax and jute.
Paper envelopes and other manufactures of paper.
Steel railway bars.
Manufactures, articles and wares of iron, steel and other metals.
All manufactures of manila, sisal grass and other vegetable fibers.
China, porcelain, parian and other wares.
Common window glass and the manufactures of glass.
Lead products.
Paints and colors.
Iron and steel rivets, bolts, &c.
Wrought-iron and steel spikes, &c.
Horse, mule and ox shoes, &c.
Cut tacks, brads and sprigs.
Horseshoe, hob and wire nails, &c.
Boiler and other tubes.
Chains of all kinds.
Files, file blanks, rasps, &c.
Iron and steel beams, &c.
Lead in ore and in pigs.
Needles.
Metallic pens.
Type-metal.
Blacking of all kinds.
Manufactures of gutta-percha, hard rubber, &c.
Manufactures of hair.
Ink of all kinds.
Brushes of all kinds.
Marble sawed and dressed, and manufactures of marble.
Manufactures of papier-maché.
Philosophical instruments and apparatus.
Webbing composed of cotton, flax and other materials.
Zinc, dry and ground in oil.
Confectionery of all kinds.

The committee estimate the value of the annual product of these industries to be at least \$2,000,000,000, and that in their prosecution employment is given to not less than 1,250,000 persons, while at least 5,650,000 are directly dependent for support on their continued existence and prosperity.

As showing the inconsistencies of the House bill the report charges that in the metal schedule tin plates, or iron and steel sheets coated with tin or lead, are placed on the free list; while iron ore and pig iron, as well as the iron bars or steel billets and slabs from which these sheets must be rolled, are dutiable at from 45 to 60 per cent. ad valorem. A duty is also placed by the bill on common black sheet iron of from 1 to 1.4 cents a pound, and iron and steel sheets, when galvanized with zinc or coated with any other metal except tin or lead, are required to pay an additional duty of from $\frac{1}{4}$ to $\frac{1}{2}$ cent a pound above these rates. There is also a duty levied of $\frac{1}{4}$ cents a pound upon pig lead.

Iron and steel cotton ties and hoops for baling or other purposes, not thinner than No. 20 wire gauge, are made free; while other hoop, band, or scroll iron is dutiable at rates varying from 1 to 1.3 cents a pound, and an additional rate of $\frac{1}{4}$ cent a pound is levied on articles wholly or partially manufactured from hoop iron. The iron bars or steel slabs from which cotton ties or hoops must be manufactured are dutiable at from 45 to 60 per cent.

Needles are placed upon the free list, while the duties on steel remain unchanged at not less than 45 per cent. ad valorem.

The report shows that the tendency under protection is to the judicious extension of the free list.

The percentage of importations of free and dutiable articles under the various tariffs which have been in existence from 1846, inclusive, is shown by the following table:

Period.	Dutiable. Per cent.	Free. Per cent.
1847 to 1857.....	88	12
1858 to 1861.....	78	22
1879 to 1883.....	70	30
1884 to 1887.....	66	34

It will be seen that with protective legislation, the report says, we have had a much larger and constantly increasing amount of free importations. The protective policy contemplates the free admission of all non-competing articles and of all those in the production of which the benefactions of nature have given other countries permanent advantages over our own.

The operations of the Senate bill are summarized as follows: Importations, 1887, values, \$425,082,497; duties, \$204,477,083; estimated imports under the Senate bill, \$397,236,606; duties, \$168,607,645; estimated decrease by Senate bill, \$35,869,437; average ad valorem rate of duty present law, 48.21; proposed bill, 42.45.

In this aggregate metals bear the following relation: Importations, 1887, \$57,784,719; duties, \$23,090,797; estimated imports under the Senate bill, \$51,402,136; duties, \$21,376,664; estimated decrease of duty by Senate bill, \$1,714,132; average ad valorem rate of duty present law, 39.96; proposed bill, 41.58.

An interesting comparative statement is given, showing articles of domestic productions, by sections, and how affected by the House bill. It aims at showing that that measure was devised in hostility to the industries of the North. The comparison is additionally valuable as showing the industrial activity of the two sections. The tariff debate will now run its course for some days. A number of Senators on both sides have speeches to make which will have more or less campaign effect.

The Springfield Iron Company, of Springfield, Ill., have established a branch office in St. Louis, which will be located in Room 164, Laclede Building. It will be in charge of Albert Waycott, formerly connected with their New York office, and also with the Troy Iron and Steel Company.

Underground Forts in Belgium.

In a recent number of *La Nature* Colonel Hennebert, of the Belgian army, describes underground forts which have come into use in Belgium, as one of the principal methods of national defense. One of these underground forts is like an enlarged molehill, and is built of concrete. Measuring 50 m. in length by from 30 to 40 in width, it is about 12 m. below the surface of the ground, and its greatest height above the earth is no more than 3 or 4 m. It presents the appearance of an elliptical cap placed on the ground, and is scarcely visible to the eye of an observer. At the center of this artificial rock are three armored towers, each with two heavy guns. There are also four small forts, which are pulled in and run out at pleasure, each armed with two rapid-firing guns. At three suitable places there are armored points of observation, from two of which at night the electric light can be flashed to watch the operations of the enemy. Below this surface the earth is hollowed out in the form of a huge well with armored sides, which is divided up into sections, each part protected with heavy armor, one part for provisions and ammunition, another for machinery, which includes the dynamos and accumulators for the lighting of the whole fort, hydraulic machines for working the movable turrets and sending them ammunition, pumps for supplying these machines with water, and a series of ventilators to keep the air pure. Communication with the outer world is made by a subterranean gallery, the length of which varies according to surrounding circumstances. The ceiling of this gallery is from 8 to 10 m. below the surface. To gain access to the fort a hydraulic piston is worked, and this raises a ladder which runs along the whole length of the fort, and lowers the door of the outlet, which is protected by armor 20 c. cm. in thickness, and is under the fire of two of the movable forts. All movements, such as changes of guard, arrivals of supplies, &c., are reported by telephone or telegraph. The guard does not work the hydraulic piston, except at command, and when the sentries in one of the movable forts have reconnoitered the visitors. Finally, the gallery communicating with the outer world is strongly fortified by an armored door defended by two mitrailleuses. One of the greatest objections by generals to forts, that they absorb numbers of men who are wanted in the field, cannot be urged against these subterranean forts, for the garrison consists of 30 or 40 mechanics and specialists only, whose absence would not appreciably weaken the regiment from which they are drawn. The cost of one of these forts is only about \$500,000.

It is reported that the Pennsylvania Steel Company, at Steelton, has had a favorable experience with the Archer fuel gas. We understand that 1026 tons of steel were heated in one day with a consumption of only 3 gallons of oil per ton of steel.

The Briggs Iron and Tool Company, Findlay, Ohio, will erect a new forge building, 160x40, on their premises. The new building will contain a 20-bar guide mill. The building to be occupied and used in the manufacture of chain, is rapidly approaching completion, the forges, anvils and machinery being very nearly all arranged in their proper places. The tool department is in continuous and active operation.

The Nordenfeldt, submarine boat, has been purchased by the Russian Government, and is now in the Baltic on her way to Cronstadt.

THE METAL SCHEDULES.

A Comparison of Present and Proposed Duties.

ARTICLES.	PRESENT RATE.	MILLS BILL.	SENATE BILL.
Iron, in pigs, kentledge and scrap.....	\$6.72 per ton.....	\$6 per ton.....	\$6.72 per ton.
Bars or rails for railways—			
Other railway bars, weighing more than 25 lbs. to the yard—			
Iron, tons.....	\$15.68 per ton.....	\$11 per ton.....	\$15.68 per ton.
Steel, or in part of steel, tons.....	\$17 per ton.....	do.....	\$15.68 per ton.
Bar Iron—			
Bars, blooms, billets, or sizes or shapes of any kind, in the manufacture of which charcoal is used as fuel, tons.....	\$22 per ton.....	\$20 per ton.....	Not less than \$22 per ton.
Rolled or hammered, comprising—			
Flats not less than 1 inch wide nor less than $\frac{3}{8}$ of 1 inch thick, lbs.....	8-10 c. per lb.....	7-10 c. per lb.....	8-10 c. per lb.; $\frac{3}{4}$ rounds and squares, 9-10 c. per lb.; smaller to 7-16 1 c. per lb.; 35 per cent. ad val. minimum.
Flats less than 1 inch wide or less than $\frac{3}{8}$ of 1 inch thick; round iron less than $\frac{3}{4}$ of 1 inch and not less than 7-16 of 1 inch in diameter, and square iron less than $\frac{3}{4}$ of 1 inch square, lbs.....	1 1-10 c. per lb.....	1 c. per lb.....	
Bars or shapes of rolled iron, not specially enumerated or provided for, and round iron in coils or rods, less than 7-16 of 1 inch in diameter, lbs.....	1 2-10 c. per lb.....	1 c. per lb.....	1 1-10 c. per lb.
Bars or rails for railways—			
Flat rails, punched—			
Iron, tons.....	\$17.92 per ton.....	\$15 per ton.....	\$15.68 per ton.
Tee rails, weighing not over 25 lbs. to the yard—			
Steel, tons.....	\$20.16 per ton.....	\$14 per ton.....	\$15.68 per ton.
Iron or steel, flat, with rib, for fencing.....	6-10 c. per lb.....	4-10 c. per lb.....	3c. value or less, 6-10c.
Sheet iron, common or black—			
Thinner than 1 inch and not thinner than No. 20 wire gauge, lbs.....	1 1-10 c. per lb.....	1 c. per lb.....	1 1-10 c. per lb.
do No. 20 do No. 25 do No. 29 do do.....	1 2-10 c. per lb.....	1 1-10 c. per lb.....	1 2-10 c. per lb.
do No. 25 do No. 29 do do.....	1 4-10 c. per lb.....	1 $\frac{1}{2}$ c. per lb.....	1 4-10 c. per lb.
do No. 29.....			1 5-10 c. per lb.
Sheets and plates, pickled or cleaned by acid, or by any other material or process, and cold-rolled—			
Sheets—			
Thinner than 1 inch and not thinner than No. 20 wire gauge, lbs.....	1 35-100 c. per lb.....	1 35-100 c. per lb.....	Polished, planished or glanced, 25-10 c. per lb.; pickled, cleaned by acid or cold-rolled, $\frac{1}{2}$ c. addition to common black gauges.
do No. 20 do No. 25 do No. 29 do do.....	1 75-100 c. per lb.....	1 75-100 c. per lb.....	
do No. 25 do No. 29 do do.....	1 75-100 c. per lb.....	1 $\frac{1}{2}$ c. per lb.....	
Sheets or plates of iron or steel (except what are commercially known as tin plates,terne plates and taggers tin), galvanized or coated with zinc or spelter, or other metals, or any alloy of these metals—			
Thinner than 1 inch and not thinner than No. 20 wire gauge, lbs.....	1 85-100 c. per lb.....	1 $\frac{1}{2}$ c. per lb.....	$\frac{3}{4}$ c. per lb. in addition to sheet iron duties.
do No. 20 do No. 25 do No. 29 do do.....	1 85-100 c. per lb.....	1 60-100 c. per lb.....	
do No. 25 do No. 29 do do.....	2 25-100 c. per lb.....	2 15-100 c. per lb.....	
Tin plates,terne plates and taggers tin.....	1 c. per lb.....	Free.....	1 c. per lb.
Hoop, band, scroll or other iron, 8 inches or less in width.....	1 c. per lb.....	1 c. per lb.....	
Thinner than No. 10 and not thinner than No. 20 wire gauge, lbs.....	1 2-10 c. per lb.....	1 2-10 c. per lb.....	1 1-10 c. per lb.
do No. 20 wire gauge, lbs.....	1 4-10 c. per lb.....	1 3-10 c. per lb.....	1 3-10 c. per lb.
Cotton ties.....	35 per cent.....	free.....	2-10 c. per lb. in addition to duty on hoops from which made, 9-10 c. per lb.
Cast iron pipe of every description, lbs.....	1 c. per lb.....	6-10 c. per lb.....	
Nails, spikes, tacks, brads or sprigs—			
Cut nails and spikes of iron or steel, lbs.....	1 $\frac{1}{2}$ c. per lb.....	1 cent per lb.....	1 c. per lb.
Cut tacks, brads or sprigs—			
Not exceeding 16 ounces to the thousand, M.....	2 $\frac{1}{2}$ c. per M.....	35 per cent.....	2 $\frac{1}{2}$ c. per M.
Exceeding 16 ounces to the thousand, lbs.....	3 c. per lb.....	do.....	2 $\frac{1}{2}$ c. per M.
Railway fish-plates or splice-bars of iron or steel, lbs.....	1 $\frac{1}{2}$ c. per lb.....	8-10 c. per lb.....	1 c. per lb.
Nuts and washers of wrought iron or steel, lbs.....	2 c. per lb.....	1 $\frac{1}{2}$ c. per lb.....	1 8-10 c. per lb.
Horse, mule or ox shoes, lbs.....	do.....	do.....	do
Spikes of wrought-iron or steel, lbs.....	do.....	do.....	do
Anvils.....	do.....	do.....	2 c. per lb.
Anchor and parts thereof, &c.....	do.....	do.....	1 8-10 c per lb.
Rivets, bolts with or without threads or nuts or bolt-blanks, and finished hinges or hinge-blanks of iron or steel, lbs.....	2 $\frac{1}{2}$ c. per lb.....	1 $\frac{1}{2}$ c. per lb.....	2 $\frac{1}{2}$ c. per lb.
Blacksmiths' hammers, sledges, &c., lbs.....	do.....	do.....	2 $\frac{1}{2}$ c. per lb.
Axles, parts thereof, axle-bars, axle-blanks or forgings for axles without reference to the stage or state of manufacture, of iron or steel.....	do.....	do.....	2 c. per lb.
Forgings of iron and steel, or forged iron of whatever shape or in what stage of manufacture, not specially enumerated or provided for, lbs.....	do.....	do.....	2 3-10 c. per lb., 45 per cent. adval. minim.
Horseshoe nails, hob nails, wire nails, &c., lbs.....	4 c. per lb.....	2 $\frac{1}{2}$ c. per lb.....	4 c. per lb.
Wire nails—			
Two inch and longer, not lighter than No. 12 W. G.....	4 c. per lb.....	2 $\frac{1}{2}$ c. per lb.....	2 c. per lb.
1 to 2 inches long, lighter than No. 12, and not lighter than No. 16 W. G.....	4 c. per lb.....	2 $\frac{1}{2}$ c. per lb.....	2 $\frac{1}{2}$ c. per lb.
Shorter than 1 inch and lighter than No. 16 W. G.....	4 c. per lb.....	2 $\frac{1}{2}$ c. per lb.....	4 c. per lb.
Tubes or flues or stays, of wrought iron or steel—			
Boiler-tubes or flues or stays, lbs.....	3 c. per lb.....	1 $\frac{1}{2}$ c. per lb.....	2 $\frac{1}{2}$ c. per lb.
Other tubes, lbs.....	2 $\frac{1}{2}$ c. per lb.....	do.....	do
Chain or chains of all kinds, made of iron or steel—			
Not less than $\frac{3}{4}$ of 1 inch in diameter, lbs.....	1 $\frac{1}{2}$ c. per lb.....	1 $\frac{1}{2}$ c. per lb.....	1 6-10 c. per lb.
Less than $\frac{3}{4}$ of 1 inch and not less than $\frac{3}{8}$ of 1 inch in diameter, lbs.....	2 c. per lb.....	1 $\frac{1}{2}$ c. per lb.....	1 8-10 c. per lb.
Less than $\frac{3}{8}$ of 1 inch in diameter, lbs.....	2 $\frac{1}{2}$ c. per lb.....	2 c. per lb.....	3 cents per lb.
Saws:			
Cross-Cut.....	8 c. per lin. ft.....	8 c. per lin. ft.....	6 c. per lin. ft.
Mill, pit and drag, not over 9 inches wide.....	10 c. per lin. ft.....	10 c. per lin. ft.....	8c. per lin. ft.
Mill, pit and drag, over 9 inches wide.....	15 c. per lin. ft.....	15 c. per lin. ft.....	13 c. per lin. ft.
Circular saws.....	30 per cent. ad val.....	30 per cent. ad val.....	30 per cent. ad val.
All other saws.....	40 per cent. ad val.....	30 per cent. ad val.....	40 per cent. ad val.
Files, file-blank, rasps and floats of all cuts and kinds—			
4 inches in length and under, doz.....	35 c. per dozen.....	35 per cent.....	35 c. per dozen.
Over 4 inches in length and under 9 inches, doz.....	75 c. per dozen.....	do.....	75 c. per dozen.
9 inches in length and under 14 inches, doz.....	\$1.50 per dozen.....	do.....	\$1.30 per dozen.
14 inches in length and over, doz.....	\$2.50 per dozen.....	do.....	\$2.00 per dozen.
Beams, girders, joists, angles, channels, car-truck channels, TT columns and posts, or parts or sections of columns and posts, deck and bulb beams, and building forms, together with all structural shapes of iron or steel, lbs.....	1 $\frac{1}{2}$ c. per lb.....	6-10 c. per lb.....	1 1-10 c. per lb.

ARTICLES.	PRESENT RATE.	MILLS BILL.	SENATE BILL.
Wheels of steel, and steel-tired wheels for railway purposes, whether wholly or partly finished, and iron or steel locomotive, car, and other railway tires, or parts thereof, wholly or partly manufactured, lbs.....	2½ c. per lb.....	2 c. per lb.....	2½ c. per lb.
Bars, billets, blooms, blanks, ingots, &c., of steel, ingots, clogged ingots, blooms, or blanks, for railway wheels and tires, without regard to the degree of manufacture, lbs.....	2 c. per lb.....	1½ c. per lb.....	1½ c. per lb.
Wire:			
Not smaller than No. 10.....	1½ c. per lb.....	Same as now, { but 60 p. c. { maximum.....	1½ c. per lb.
No. 10 to No. 16.....	32 c. per lb.....		1½ c. per lb.
No. 16 to No. 26.....	62½ c. per lb.....		2½ c. per lb.
Smaller than No. 26.....	3 c. per lb.....		3 c. per lb.
Covered with cotton, silk or other material.....	6 c. per lb.....	do.....	45 per cent. ad valorem.
Wire cloth and netting.....	7 c. per lb.....	do.....	do do do
Galvanized wire.....	2 c. to wire same gauge.	do.....	2 c. to wire same gauge.
Wire rope and strand, iron.....	½ c. add to wire.....	do.....	½ c. add to wire.
do do steel.....	1 c. add to wire.....	do.....	1 c. add to wire.
Wire valued at 10 c. or more.....	2 c. add to wire.....	do.....	2 c. add to wire.
Clippings from new copper not separately enumerated, lbs..	2½ c. per lb.....	do.....	45 per cent. ad valorem.
Copper in plates, bars, &c, lbs.....	3 c. per lb.....	do.....	do do
do brazier plates, lbs.....	1 c. per lb.....	1 c. per lb.....	1½ c. per lb.
do ore.....	4 c. per lb.....	2 c. per lb.....	2 c. per lb.
do regulus.....	35 per cent.....	30 per cent.....	35 per cent.
Old copper.....	2½ c. per lb.....	Free.....	1½ c. per lb. fine.
Lead, and manufactures of—	3½ c. per lb.....	do.....	1½ c. per lb. fine.
Molten and old refuse lead, run into blocks and bars, and old scrap lead, fit only to be remanufactured, lbs.....	3 c. per lb.....	do.....	1½ c. per lb.
Lead ore and lead dross, lbs.....	2 c. per lb.....	do.....	2 c. per lb.
Pigs and bars, lbs.....	1½ c. per lb.....	do.....	2 c. per lb.
Sheets, pipes, and shot, lbs.....	3 c. per lb.....	2½ c. per lb.....	2½ c. per lb.
Sheathing metal, lbs.....	35 per cent.....	30 per cent.....	35 per cent.
Nickel, in ore, matte, or other crude form, &c.....	15 c. per lb.....	10 c. per lb.....	5 c. per lb. in ore. 10 c. per lb. in matte. 15 c. in metal, oxide or alloy.
Zinc ores, not enumerated.....		20 per cent.....	
Zinc, spelter or tuteague—			
In blocks or pigs, lbs.....	1½ c. per lb.....	1½ c. per lb.....	1½ c. per lb.
Old worn out, fit only to be remanufactured, lbs.....	do.....	do.....	1½ c. per lb.
In sheets, lbs.....	2½ c. per lb.....	2 c. per lb.....	2½ c. per lb.
Hollow-ware, coated, glazed or tinned, lbs.....	3 c. per lb.....	2½ c. per lb.....	2½ c. per lb.
Needles:			
For knitting or sewing machines.....	35 per cent.....	20 per cent.....	35 per cent.
For sewing, darning, knitting.....	25 per cent.....	free.....	25 per cent.
Pens, metallic, gross.....	12 cents.....	35 per cent.....	12 cents.
Type metal.....	20 per cent.....	15 per cent.....	1½ c. for lead contents.
New type for printing.....	25 per cent.....	do.....	25 per cent.
Manufactures of copper.....	45 per cent.....	35 per cent.....	35 per cent.
Machinery not elsewhere specified.....	do.....	40 per cent.....	
Wire rods of steel, not elsewhere specified, lbs.....	do.....	do.....	{ Not smaller than No. 6, 6-10 c. per lb.
All other manufactures of iron.....	do.....	do.....	
Manufactures of lead.....	do.....	do.....	45 per cent.
“ “ nickel.....	do.....	do.....	do
“ “ pewter.....	do.....	do.....	do
“ “ tin.....	do.....	do.....	do
“ “ zinc.....	do.....	do.....	do
“ “ gold and silver.....	do.....	do.....	do
“ “ platinum.....	do.....	do.....	do
“ “ brass.....	do.....	do.....	do
“ “ bronze.....	do.....	do.....	do
“ “ metal not elsewhere specified.....	do.....	do.....	do

NOTE.—For changes in iron castings, malleable-iron castings, boiler plate, steel ingots, blooms and billets, iron and steel of irregular section, cutlery, screws, &c., see article published elsewhere.

Andrew Carnegie on Trusts.

Mr. Andrew Carnegie returned from Europe this week, in company with Henry Phipps and W. R. Jones, and was promptly interviewed, the principal part of his talk being confined to discussing trusts. He is reported as having said:

The truest words that can be said about trusts are that no one has much cause to fear trusts except he who goes into them. There is no possibility of maintaining a trust. It is bound to go to pieces sooner or later, and generally to involve in ruin those foolish enough to embark in it. If successful for a time and undue profits accrue, competition is created which must be bought out, and this leads to fresh competition, and so on until the bubble bursts.

Then the article which it was proposed to enhance in price is made for years without profit, and the consumer has his ample revenge. When you find me trying to organize any steel rail trust, set it down that softening of the brain has surely begun. There should be displayed in the office of any trust an illuminated text:

“If I was so soon to be done for, I wonder what I was begun for.”

It has been vigorously maintained by free traders and others that the protective system produces trusts.

It has no more to do with trusts than with the tides. The chief trusts are in Europe. The copper syndicate is a French trust; the salt trust is English, and the greatest trust I have ever known was the steel rail trust in England, which embraced the Continental works as well. Of course it went to pieces, as is the nature of trusts, and as a consequence the foolish combiners have ever since been bestowing steel rails upon an ungrateful world for less than cost.

The public may regard trusts or combinations with serene confidence, for the great law cannot be broken—namely, that where there is no monopoly, but every one is free to embark in the business, it is impossible for any body of men to exact from this people for any length of time more than the average return for capital and labor. Whenever undue profits are made, competition soon steps in.

It is the same with railroads. New York Central has its West Shore and the Milwaukee St. Paul as its rival. Notwithstanding all we hear of railroad pools, the result is that America enjoys the cheapest and best railroad transportation in the world, just because there is no monopoly. People can build other railroads, and build them they will, whenever any one line is seen to reap dividends beyond the average. Just so with trusts. Watch the end of

the copper or coffee or sugar trusts, or salt, or European steel rail trust, and you will see that this great law will be obeyed.

It is natural that manufacturers should meet and resolve and re-resolve in a period of depression that they will stop bleeding each other to death; but I have never known an attempt to defeat the law to be permanently successful. When I was very young in business and not very strong financially, I used to hope that something could be done in the way of combination with others to prevent impending ruin. But the result was always a failure, and often personal bitterness between men who had before been on good terms with each other, and then a renewal of the fierce struggle with increased energy.

The fatal weakness of all trusts is that if successful temporarily they cause permanent injury, for under higher prices other concerns grow strong. They may have a million of dollars to lose, rather than risk the cost, disorganization and danger of a stoppage of the works. This is the case in England to-day. Since the trust broke in steel rails there has been a struggle as to which should crowd out the others, and for several years this has been carried on. To be permanently successful the manufacturer must make up his mind that the day of exorbitant profits is at an end and take a small profit per ton or per

yard, and make great quantities and let the consumer have everything cheap.

Then you mean to say that there is no trust in steel rails?"

Not any more than there is among the morning newspapers of New York. We can no more combine than the newspapers. There are 14 steel rail mills in the country and a new competitor just about ready to start. Every mill manages its own business and fixes its own prices. Just look at the situation. Rails sold for \$40 per ton this time last year because all the mills, running night and day, could not supply the demand. There was no artificial raising of prices. To-day they have fallen to \$28 per ton because there is not demand for all the mills can make. Not much of a trust here, is there?

No trade in this country is more disastrously competed for than that of steel rails, and there never was and never could be a trust created that would last through a period of depression. Any railroad company can to-day exchange a ton of its old, worn-out rails and get a ton of new steel rails by paying \$5 difference. This is what a protective duty has done in a few years. It has tempted so much capital into the manufacture of steel rails that no manufacturer can hope to get a fair dividend upon the capital except through works of recent construction, favorably located, and the closest and most skillful management.

The consumer gets steel rails for \$28 per ton, and has not paid more than \$40 per ton for years even when a great boom was on and every one wanted rails in a hurry. Yet you will find now and then some professor writing in his closet who knows nothing but what he reads in old English text-books that the duty is added to the cost and paid by the consumer. The total cost of rails to-day is only the amount of the original duty imposed—viz., \$28 per ton. If these doctrinaires are right that the consumer pays the amount of the duty, then, deducting the \$28 duty, there would not be a cent left for the rails. It's the fashion just now to assert that manufacturers of steel rails in this country have made unusual profits. Nothing could be more groundless. The capital invested in the Bessemer steel rail manufacture, taken as a whole, has not paid interest. If the business is so profitable why don't those who think so invest in it? They need not build new works. The shares of many of the existing works can be bought any day through brokers for less than the capital invested, as shown by the books of the concerns. We make much more iron and steel in various shapes than we do rails, for rails have not paid us as much per ton as other forms. The rail business is good about one year in four, and then for four years manufacturers are fortunate who pay their interest account, competition is so terribly severe.

An Electric Crane.—At the recent meeting of the British Association for the Advancement of Science Mr. W. Anderson read a paper on "The Application of Electricity to the Working of a 20-ton Traveling Crane." He explained that one of the traveling cranes at Erith Iron Works, England, was originally constructed to be worked by hand, but preparation had been made to apply wire rope driving. The inconveniences of this plan were considerable, and electricity was introduced as a motive power, a dynamo being fixed in the boiler-house for this purpose. The motor was shunt-wound, and provision was made for varying the power and speed to suit the requirements of the foundry. A single attendant could work the machine, which had worked satisfactorily since June last. About 65 per cent. of the power developed

in driving the steam-engine was utilized. One or two more electric cranes were at work in other factories.

CORRESPONDENCE.

The Babcock & Wilcox Company.

To the Editor: You have done me the honor to copy a letter which I wrote to the New York Times from Holland in regard to the shipment by the Babcock & Wilcox Company of boiler tubes from this country to Glasgow. I notice that through an error of the types either in the office of the New York Times or in yours I am made to say that the sales of our company for the month of June required 1,000,000 feet of 4-inch tubes, whereas I wrote 100,000. The error is merely one cipher, but it is worth correcting, as I would not have any one suppose that I would deliberately make so wild a mis-statement. I thought that 100,000 feet of tubes in a month was a sufficient quantity to make a note of. Though the sales for the month of September are nearly twice as great as those for June, we do not hope to get up to the 1,000,000 feet per month—at least for some time to come. Very truly yours,

GEO. H. BABCOCK.

Engines of the Steamer Connecticut.

The steamer Connecticut, built for the Providence and Stonington Steamship Company, is provided with an engine of a type not unusual abroad but almost new here, and differing widely from the beam engine which has been almost universally employed in our Eastern waters. This engine was, like the boat itself, designed by Mr. George B. Mallory, and has been built under his supervision by the William Cramp & Sons Ship and Engine Building Company, of Philadelphia. It is a compound oscillating engine—the largest of the kind ever built in this country—having a high-pressure cylinder 56½ inches diameter and a low-pressure cylinder 104 inches diameter, both having 11-foot stroke.

The steam-port nozzles for the high-pressure cylinder are 6 x 41 inches inside, and those for the low-pressure cylinder 8½ x 100 inches inside. The steam passes through the high-pressure trunnion through a composition stuffing-box sleeve 24 inches inside diameter, surrounded by stuffing-boxes and double air spaces. From the trunnion it passes through a side pipe 18 inches inside diameter to the valve-chest. From the exhaust chests the steam passes to the exhaust trunnion through a 22-inch side pipe. The high-pressure exhaust trunnion is connected with the low-pressure trunnion by a receiver pipe 26 inches inside diameter, having an easy bend and surrounded by a steam-jacket with 2-inch spaces. The exhaust side pipe on the low-pressure cylinder is 33 inches diameter; from the exhaust trunnion the steam passes through a grease extractor, and thence to the steam space in the surface condenser through a copper pipe 33 inches diameter.

The cylinders are cast without heads, the heads and steam-chests being bolted on; the upper head of each cylinder is fitted with heavy double brackets for guides for each piston-rod, those for the small cylinder being 15 inches, and those for the large cylinder 21 inches long. The pistons have cast-iron rings, and steel springs are provided for setting out these rings. The piston-rods for the high-pressure cylinder are 9 inches, and those for the low-pressure cylinder 10 inches diameter. The valve-gear is Wheelock's improved gridiron, with automatic trip cut-off. The steam opening on the high-pressure cylinder is 6½ x 52 inches, and the exhaust opening 11½ x 52 inches, while on the low-pressure cylinder the openings are 9½ x

102 inches and 19½ x 102 inches, respectively. The valve motion is of the link type, and there are three eccentrics, two for the link and one for the cut-off. A small steam engine is provided for working the reverse-lever and adjusting the valve-gear. The surface-condenser is of cast iron, box form, containing 3916 brass tubes ¾ inch outside diameter, the distance between the tube-sheets being 16 feet. The exposed surface is about 12,150 square feet. An auxiliary condenser is also provided, having about 750 square feet of exposed tube surface.

There are two single-acting air pumps 35 inches diameter and 17-inch stroke; four feed pumps 5 inches diameter and 17-inch stroke, and two bilge pumps of the same size. These eight pumps are arranged in two sets of four each, worked from a horizontal crankshaft, and between the two sets is placed the engine which works them, a compound engine with high-pressure cylinder 14 inches, low-pressure 24 inches diameter, both 17-inch stroke. There is also an auxiliary air and circulating pump. The main circulating pump is a centrifugal pump with suction and delivery pipe each 16 inches in diameter. The engine is carried by two heavy keelsons of steel plates and angle irons, upon which are the A-shaped galleys frames of box girders built up of wrought-iron plates and angles. These frames are connected by sway braces, and carry on top the pillow blocks for the main shaft. The keelsons rest on yellow pine keelsons on top of the cross floors, and are securely bolted to and through the hull timbers. The condenser is carried on the after end of the steel keelsons. The crank is of the built-up form, the crank pin having a bearing 18 inches diameter and 49 inches long. It is shrunk into one crank arm, and secured by a nut at one end and gibs at the other. The crank arms are also shrunk on and keyed to the ends of the two shafts, each of which is 33 feet 6 inches long, and has journals 23 and 25 inches diameter.

The boat has feathering paddle-wheels 28 feet diameter between centers of the bucket trunnions. There are 12 buckets, each 14 feet face and 4 feet 6 inches wide. The buckets are of oak 4½ inches thick. The wheel-frame carries bearings for the bucket trunnions, and the feathering motion is given by eccentrics keyed on the main shaft. Steam is furnished by six boilers of the "gunboat" type, each 12 feet 6 inches diameter and 20 feet 1½ inches extreme length. These boilers carry 120 pounds working pressure, and are of steel, all rivet holes drilled, the outside shell ¼ inch thick. In each boiler there are three corrugated furnaces 48 inches inside diameter and 7 feet 6 inches long; back of the furnaces is a deep combustion-chamber from which run 424 tubes 3¼ inch diameter and 8 feet long. The boilers are arranged in two sets of three each, and over each set is a superheater 11 feet diameter and 12 feet extreme height, having a single flue 7 feet 6 inches diameter. The smokestacks stand directly on the superheaters. There is also a donkey-boiler of the locomotive type 7 feet diameter of barrel and 12 feet long over all, made of steel. It has 156 tubes 3 inches diameter. Six independent steam pumps are provided for feed and other purposes. The engine is expected to develop about 4500 indicated horse-power at 25 revolutions per minute with a full load—about 500 tons—on board. When driven at full power, 5500 horse-power will be developed, and a speed of 19½ miles per hour obtained for the vessel.

The Jarecki Mfg. Company, Limited, of Erie, Pa., are building a small addition to their works to meet the demands of increasing business.

TRADE REPORT.

Chicago.

Office of The Iron Age, 96 and 97 Washington St.,
CHICAGO, October 8, 1888.

Pig Iron.—Some improvement is to be noted in the demand, and prices show a renewed upward tendency. The advance now in progress is mainly confined to the brands which have been selling at the lowest figures, makers finding that the market is in condition to sustain an additional 50¢ to \$1 per ton. The change in quotations is, consequently, a revision of inside figures. There is also such a demand for high numbers of Lake Superior Charcoal, due to the scarcity of Old Car-Wheels, that some furnace companies have advanced their price of Nos. 4 to 6 from 50¢ to \$1 above the lower numbers. The scarcity of Pig Iron for immediate shipment has been pretty thoroughly demonstrated by the experience of some of the dealers during the past week. Desiring to accommodate some of their customers, and their own furnaces being sold up, they have applied to a considerable number of other furnaces without being able to secure any quantity. The immediate demand being for small lots, consumers are supplied by this scouring of the sources of production, but if larger quantities should be called for there would certainly be a deficiency in the supply, causing either a sharp advance in price or the starting up of additional furnaces now standing idle. Some indications of such a demand are now visible, inquiries being received for round lots from heavy consumers who have evidently not fully covered their requirements. The architectural foundries are very quiet, but other foundries are quite busy. The advance in freight rates mentioned in last week's report was not on Pig Iron from the Mahoning and Shenango valleys, but on Southern Pig Iron. The rate from Birmingham to Chicago is now \$4.15. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$20 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$17.50 @ \$18.50; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband) No. 1, \$19.75 @ \$20; other Ohio Scotch Irons, No. 1, \$18 @ \$19; Lake Superior Coke, No. 1, \$18.50 @ \$19; No. 2, \$17.50; No. 3, \$16.50; Southern Coke, No. 1 Foundry, \$18 @ \$18.50; No. 2 Foundry and No. 1 Soft, \$17.50; No. 3 Foundry and No. 2 Soft, \$16.75 @ \$17; Gray Forge, \$16.25 @ \$16.50.

Bar Iron.—Business shows a little improvement, though the demand is by no means general. The mills are so well supplied with work, however, that dullness could probably continue for some weeks yet without affecting prices very much. Buyers are endeavoring to secure better terms by various ingenious devices, but they have little prospects of success so long as manufacturers have plenty of orders on their books and at the same time find raw material as dear as it now is. Car orders are being talked about, but most railroad companies are still too poor to purchase the rolling stock which they so badly need. Quotations are unchanged, at 1.75¢ @ 1.80¢, half-extras, f.o.b. Chicago, for mill lots of Common Iron, but the Ohio and Pittsburgh manufacturers are now endeavoring to establish a rate f.o.b. mill, as they are apprehensive of an advance in railroad freights. Small lots of Common Iron are quoted at 2¢ from store, with 1.90¢ @ 1.95¢, asked, for carloads.

Structural Iron.—Very little new business is reported. Mill lots of Angles are

quoted at 2.20¢ @ 2.25¢, f.o.b. Chicago; Universal Plates, 2.25¢; Tees, 2.55¢ @ \$2.65; Beams and Channels, 3.40¢. From store, Angles are quoted at 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.75¢; Beams, 3.80¢.

Plates, Tubes, &c.—While a very fair volume of business is in progress, trade is somewhat disappointing, as it had been supposed that the excellent demand of August and September would develop this month into decided briskness. No change in store prices has been made that would affect quotations, but an upward tendency is indicated by the higher rates now being asked on large lots. Tubes are firmer, although some manufacturers have not advanced their discount to the rate named by the majority. Quotations from store are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 62½ % off.

Sheet Iron.—The scarcity is as marked as ever, buyers finding great difficulty in picking up even a single bundle from the jobbing houses. Jobbers need all they are now receiving from the mills to fill orders taken some time since. The manufacturers are harassed as they have seldom been by urgent appeals to make more prompt deliveries. Few of them are now making quotations, their full capacity being engaged to the end of the year. Jobbers' quotations from store are still 3.20¢ for No. 24, 3.30¢ for Nos. 25 and 26, and 3.40¢ for No. 27.

Galvanized Iron.—Large as the demand was last year at this time, it is greatly exceeded by the activity now prevailing. No one cause seems to be responsible for the improved condition of trade, but all classes of consumers except the cornicemen have increased their purchases. The dealers have had much difficulty recently in supplying orders from stock, often being unable to furnish the particular gauge desired. Prices are firmly maintained, small lots being quoted at 60 % off for Juniata, and 60 % and 5 % off for Charcoal.

Merchant Steel.—Business continues quiet, the few large consumers who have not yet placed their season contracts being evidently inclined to wait either until after the election or toward the close of the year. Combination prices are unchanged, as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Actual business still appears to be confined to small lots, but enough inquiries for large quantities are in the market to make manufacturers feel hopeful of a much better condition of trade shortly. Some of the leading railroad companies of the Northwest are asking for quotations for next year's delivery, and it is altogether probable that they will have numerous followers as soon as it is known that they have positively closed such contracts. An incentive to such action is the knowledge that manufacturers look forward to higher prices in 1889, although they frankly concede that at present the indications are not in favor of greatly increased business. For fall delivery nominal quotations are \$30 @ \$31.

Old Rails and Wheels.—Such transactions in Old Iron Rails as have come to light in the past week seem to indicate a return to lower prices. A lot of 800 to 1000 tons was sold by a railroad company in Central Illinois at \$24 delivered in the Mahoning Valley, or equivalent to \$23 at Chicago, allowing for difference in freight rates. Chicago holders ask \$24 @ \$24.50

for such lots as they control, and claim that they will not take lower prices, as the supply available at present is very limited. Old Steel Rails are in moderate demand at \$19 @ \$20 for straight pieces over 3 feet in length and free from Frogs, &c. Old Car Wheels are very quiet, owing to scarcity, a nominal quotation being \$20, but it is hardly likely that consumers would pay so much.

Scrap Iron.—But little movement is reported, although inquiries for Wrought are becoming more numerous, and a few sales of Mill and Cast have been made. Stocks are not large in dealers' hands, and they are inclined to ask higher prices, naming the following rates for carefully selected Scrap @ ton of 2000 lb: No. 1 Forge or Railroad Shop, \$20.50 @ \$21; Track, \$19.50 @ \$20; No. 1 Mill, \$16; Pipes and Tank, \$13; Light Wrought, \$10; Horseshoes, \$19.50; Axles, \$26; Cast Machinery, \$14.50 @ \$15; Stove Plate, \$11; Cast Borings, \$9; Wrought Turnings, \$12; Axle Turnings, \$14; Coil Steel, \$15; Leaf Steel, \$16 @ \$17; Locomotive Tires, \$16 @ \$16.50; for Mixed Country Scrap dealers offer \$13.50 @ \$14.

Hardware.—Jobbers of Heavy Hardware report business in a very satisfactory condition, prices being pretty well sustained, the demand large and constantly growing for Iron, Steel, Carriage and Wagon stock, Farriers' Supplies, &c., and collections good. In Shelf Hardware a decided improvement is noted over the previous week, all classes of building materials being in active demand, as well as House-Furnishing Goods and small wares generally. In Stamped Tinware prices have been advanced to 70 % and 70 % and 10 % off. Screws are also manifesting a decided upward tendency. No special changes worthy of note have occurred in other lines.

Nails.—Few sales of large lots are reported either of Cut or Wire Nails. The heavy stocks laid in by Missouri River jobbers during the railroad war last spring are not yet entirely exhausted, and in this immediate vicinity the consumptive demand has not for some time been sufficiently strong to require continued renewal of stocks by jobbers. The demand is so slow, in fact, that specifications are being withheld by parties who had more contracts when Steel Nails were selling at \$1.75 at factory. Another advance in Wire Nails is expected soon, but in Cut Nails everything waits on the result of the attempt to form a combination of the manufacturers. Steel Cut Nails are still quoted at \$2.05 @ \$2.10 for carloads, and \$2.15 for small lots, but manufacturers' prices are being cut to some extent, so that the market cannot be called firm. Wire Nails continue firm at \$2.60 for small lots.

Barb Wire.—Business is distressingly dull, and the condition of trade is not made any better by offers of Barb Wire at prices evidently dictated by financial necessity. Manufacturers and jobbers are endeavoring to get 2.90¢ for Painted and 3.65¢ for Galvanized in a regular way. The abandonment of the latest effort to harmonize the views of manufacturers precipitates a struggle for existence which must soon thin their numbers considerably, if trade does not improve sufficiently to sustain an advance.

Pig Lead.—Small quantities have been sold at 5¢ @ 5.05¢, but consumers have secured considerable stock at slightly lower prices and now claim to be well supplied for the future.

Charles Himrod & Co., 115 Dearborn street, have been appointed sales agents for the Jackson Iron Company, who have started up the Huron Furnace, at Jackson, Ohio, and will turn out a superior grade of Soft Pig Irons.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., October 9, 1888.

Pig Iron.—There is no perceptible change since last week, the tone of the market being steady and firm. It seems unnecessary to go over the ground again, as the conditions are precisely the same as last week. There is no scarcity of business at the inside figure, and no scarcity of Iron at the outside rates. Furnaces are well supplied with orders, and consumers have covered their anticipated requirements well on to the close of the year, so that for the present there is no urgent necessity either to buy or sell. The probabilities are, that there will be a "stand-off" until after the election, and then it is expected that the movement will be a lively one in case the Republican party wins. In the other event, business may possibly fall into a rut similar to that experienced during the first seven or eight months of the year, although there is a great deal of work which cannot well be postponed, no matter who is elected. Cars, for instance, are badly wanted by many roads, and it is thought that ship-building will be actively prosecuted during the next 12 months; and, besides that, the country is making progress in every direction, so that the increase of population and the increase in wealth must necessarily create a demand for manufactures of all kinds. As regards Pig Iron, an additional reason for its firmness is said to be the scarcity of good Ores, and the tendency of all materials to a higher range of cost. Of course it is impossible to make predictions with much confidence until after the elections, but there is an undertone of strength and expectancy, which under favorable conditions might start things on a run, but in the meantime there is a disposition to wait developments, feeling that under any circumstances prices are by no means high, and not likely to hurt legitimate dealers who confine their operations within their usual time limits. Sales during the week have been on the basis of \$16 @ \$16.50 at tide for standard brands of Gray Forge, \$17.50 @ \$18 for No. 2 Foundry and \$18.50 @ \$19 for No. 1, with the usual premium on strictly choice and favorite brands. We note a sale of 2000 tons of Pulaski Gray Forge at a sum equal to \$16.50, Philadelphia.

Blooms.—There is a good deal of inquiry, but buyers have not responded to the demand for higher prices, as might have been expected. Sales within limits as follows: Nail Slabs, \$29 @ \$29.50, at mill; Billets from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29.50 @ \$30.50 for Nail Slabs; \$34 @ \$36 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martina, price according to analysis, &c.

Muck Bars.—The scarcity continues, and prices again show a slight advance on last week's quotations. Asking rates are \$29.50 @ \$30, delivered, with sales reported at the first-named figure, and also at \$29 at mill.

Bar Iron.—No great amount of business has been placed during the past week, but mills have so much work on their books that they are not in a position to take much more for early delivery. There is a good deal of inquiry, however, and it seems more than likely that when the present orders are worked off there will be plenty more to replace them. The advance noted last week has been fully maintained, and the feeling is one of great firmness all the way through the list. Skelp Iron is still wanted in large lots and several lots have been taken at 1.95¢,

although 2¢ is now the general asking price, which would probably be paid for prompt deliveries. Bars range from 1.85¢ to 2¢, according to delivery, quantity and requirements as to quality, the entire market having a steady and firm appearance.

Plate and Tank Iron.—There is a fair demand for Plates of every description, but there is no unusual pressure, although mills are running full on orders for early delivery. There is work in prospect which may bring in large orders in course of a few weeks, but in the meantime mills have plenty to go on with and are likely to be in good shape during the balance of the year. Prices about as quoted last week: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—There is a good deal of inquiry for bridge material, and although there is no special urgency in the demand, the outlook is thought to be very encouraging. The mills are somewhat pressed for early deliveries, and specifications on old contracts are being hurried forward. Prices same as last week, viz.: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand is well maintained, but prices have not responded to the increased activity. Small lots command the following prices for the best makes:

Best Refined, Nos. 26, 27 and 28.... 3¼ @ 3½¢
Best Refined, Nos. 18 to 25.... 3 @ 3½¢
Common, ¼¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28.... 4¼ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25.... 4 @ 4½¢
Best Bloom Sheets, Nos. 16 to 21.... 3¾ @ 3½¢
Blue Annealed..... 2.8 @ 3 ¢
Best Bloom, Galvanized, discount..... 62½¢
Common, discount..... 67½¢

Merchant Steel.—There is a fair demand at prices quoted herewith—viz.: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2.7¢ @ 2.9¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—The demand is not important, and orders for this year's delivery are readily placed at \$29 @ \$29.50, according to quantity, &c. There is some inquiry for spring delivery, but sellers are a little undecided in regard to quotations, although \$30 would probably be shaded on a desirable class of business.

Old Rails.—There is nothing doing in this market, although there are buyers at \$23 and sellers at \$24 for foreign shipments. No sales of spot lots, but \$25 has been paid for deliveries at mills in the interior.

Scrap Iron.—There is a fair movement, and sales are readily made at about the following quotations: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—Mills are filled with orders well up to the end of the year. Prices are firm, and Pipe is very scarce. Discounts are quoted as follows: Black Butt Welded, 52½¢; Galvanized do., 42½¢; Black Lap Welded, 62½¢; Galvanized do., 52½¢; Boiler tubes 60¢.

Nails.—The demand is very disappointing, and the feeling in the trade is one of great depression. Prices are nominally from \$1.95 to \$2 from store, but quota-

tions are very irregular, and depend very much upon circumstances in each individual case.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, October 8, 1888.

The general Iron situation continues in a fairly satisfactory condition. There is no falling off in the volume of business notwithstanding the near approach of the Presidential election, but there is continued complaint in regard to prices. There is a very large volume of business in the aggregate. This is evident from the fact that nearly all the mills and furnaces are in operation, and some of the former are being worked up to their full capacity. Never before, possibly, was there a larger output of Iron and Steel in this district than at present, and but for the closeness in prices there would be no room for complaint. River navigation has again been resumed, an important matter for our manufacturers, who are very much interested in cheap transportation. The placing of an order here or elsewhere often hinges upon transportation, and rates by river are always less than by rail. Finished Iron is often shipped from Pittsburgh to St. Louis, a distance of about 1200 miles, for 10¢ @ 12½¢ per 100 lbs., whereas the rate by rail is nearly double. The Fifth Avenue Cable Road will be opened up for business this week, and the Penn Avenue Cable Road will, it is expected, be ready for business about the 1st of December. Pittsburgh can also boast of two electric street railroads, one of which is said to be the best built and equipped road of the kind in the country.

Pig Iron.—There has been an increased volume of business during the past week, and while there has been no advance in price, the market is firmer. Consumers generally appear to have arrived at the conclusion that there is not much risk in buying at present prices, and that some of them are apprehensive of an advance is evident from the fact that they are anticipating future wants. Included in the sales reported was one of 4000 tons for future delivery. The market is firmer than it was a couple of weeks ago, and furnacemen who were then disposed to make additional contracts are now indifferent. Consumers, now that they can see no prospect of any immediate reaction, are inclined to keep up their stocks of the raw article, while furnacemen, with very few exceptions, are pretty well sold up. Some of them have contracts enough booked to keep them busy for several months to come. However, while the market has steadied up there is no indication of any immediate advance; in a word, the feeling generally obtains that the market will continue to rule fairly active and steady at about present prices. We quote as follows:

Neutral Gray Forge.....	\$15.75 @ \$16.50.	cash.
All Ore Mill.....	17.00 @ 17.50.	"
White and Mottled.....	15.00 @ 15.50.	"
No. 1 Foundry.....	18.00 @ 18.50.	"
No. 2 Foundry.....	17.00 @ 17.50.	"
No. 3 Foundry.....	16.00 @ 16.50.	"
No. 1 Charcoal Foundry.....	23.50 @ 24.00.	"
Cold Blast Charcoal.....	25.00 @ 26.00.	"
Bessemer Iron.....	18.00 @	"

Included in the sale reported was 1500 tons Gray Forge at \$16.50, cash, and 4000 tons Bessemer at \$18, cash.

Muck Bar.—There is more doing, but no change in prices; sales 1500 tons at \$29, cash. A novel transaction was reported which hinges upon the result of the Presidential election: 1000 tons for November delivery, the price for which is to be \$31.50, cash, if the Republicans are successful, whereas, if Cleveland is re-elected, it is to be \$29.50, cash.

Ferromanganese and Spiegel.—Sales of 80 ¢ Ferromanganese at \$56 @ \$56.50, cash, and Spiegel at \$28 @ \$28.50, cash.

Manufactured Iron.—There is a continued steady demand for all kinds of Merchant Iron, Sheet in particular, which is always active at this season of the year, when it is wanted for Stove Pipes, and prices are a shade higher. We continue to quote Bars at 1.80¢ @ 1.85¢; Plate, 2.20 @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.95¢; Skelp Iron, 1.85¢ @ 1.90¢ for Grooved, and 2.10¢ @ 2.12¢ for Sheared. The mills making a specialty of Pipe are reported quite busy—as having all they can do.

Nails.—There is no improvement in the demand for Nails, nor can it be expected at this season of the year. So far as Pittsburgh is concerned this has been a very poor year. In addition to a very light demand, prices have been unsatisfactory; while it is true that full card rates are being realized, it is also true that they afford little or no margin for profit. Pittsburgh manufacturers are stiff at full card rates and indifferent then, claiming that full card rates afford little or no margin for profit. We continue to quote at \$1.90, 60 days, 2 % off for cash.

Wrought-Iron Pipe.—There is a continued good demand, especially for small sizes. Mills are all busy and prices firm but unchanged. Discounts on Black Butt-Welded, 55 %; on Galvanized do., 50 %; on Black Lap-Welded, 65 %; on Galvanized do., 55 %; Boiler Tubes, 62½ % off; 2-inch Tubing, 13¢ per foot net; 5½-inch Casing, 40¢ per foot.

Old Rails.—There is more inquiry, and while the market is firmer prices remain unchanged. We can report a sale of 3000 tons American Tees at \$25.25, and 1000 tons Foreign Double-Heads at \$26, cash. As some buyers are buying for future requirements it is evident that they do not anticipate lower prices.

Billets, &c.—We can report sales of Bessemer Steel Billets at \$29, cash, delivered on cars at makers' works, and Nail Slabs at same price. Sales of Crop and Bloom Ends at \$18.50 @ \$19, cash.

Steel Rails.—Heavy sections are quoted at \$29.50 @ \$30, cash, on cars at mill here.

Merchant Steel.—There is a fair business; no change in prices, Best Brands Tool Steel, 84¢; Crucible Spring, 44¢; Crucible Machinery, 5¢; Open Hearth ditto, 24¢.

Old Material.—There is a fair demand, but no change in prices. No. 1 Wrought Scrap, \$21, net ton; Car Axles, \$26 @ \$27; Wrought Turnings, \$14.50 @ \$15; Cast Scrap, \$16, gross; Cast Borings, \$12.50 @ \$13, gross; Car Wheels, \$20, gross.

Cleveland.

CLEVELAND, October 8, 1888.

Iron Ore.—Very much to the surprise of the purchasers of Ore, transportation rates have declined several points during the past week. The partial failure of crops in the Northwest is responsible for this hitherto unknown occurrence. Vessel rates had been steadily climbing upward for the past month, and the Ashland and Two Harbors rate seemed likely to reach \$2.25 per ton. Owing, however, to the limited amount of grain offered for shipment at Duluth, many new vessels have asked for business at Ashland, Marquette and Escanaba. As a result charters are reported to-day at \$1.30 from Escanaba to lower lake ports, \$1.50 from Marquette and \$1.65 from Ashland and Two Harbors. This reduction in the cost of bringing Ore to the furnaces finds expression in a slightly easier feeling as to prices. While the general range of quotations cannot be changed, it is known that the

inside figures given in the list below very closely represent the prices at which Ores have been sold during the past week. The amount of business done has not been large owing to the fact that the best Bessemer are very closely sold up. The season's shipments are close up to 3,400,000 tons, and seem likely to slightly exceed 3,750,000 tons. This, however, does not fairly represent the business for the year, which opened with 700,000 tons of Ore on the docks at lower lake ports. This has gone into consumption, and there is little likelihood of the season's closing with any substantial quantities of unsold Ore on dock. Quotations, f.o.b. cars lower lake ports, are as follows:

No. 1 Specular and Magnetic Bessemer Ore.....	\$6.00 @ \$6.15
No. 1 Specular and Magnetic Non-Bessemer Ore.....	5.25 @ 5.50
Red Hematite Bessemer Ore.....	5.00 @ 5.25
Red Hematite Non-Bessemer Ore.....	4.10 @ 4.40
Menominee Range Bessemer Ore.....	5.15 @ 5.50
Menominee Range Non-Bessemer Ore.....	4.00 @ 4.25
Gogebic Range Bessemer Ore.....	5.25 @ 5.50

Pig Iron.—The market retains all its healthy conditions. A large amount of Iron is being sold at very firm prices, the tendency being toward advances all around. Sellers are, quite sensibly, not attempting to force prices, preferring instead a steady market at quotations admitted to be fair to all concerned. Buyers seem to be anticipating an advance, for many purchases largely in excess of immediate wants are reported. Mill and Foundry Irons are particularly strong. The following are cash quotations:

Nos. 1 to 6 Lake Superior Charcoal.....	\$20.50 @ \$21.50
No. 1 Strong Foundry, Bessemer quality, per ton.....	18.20 @ 19.00
No. 1 Strong Foundry, per ton.....	17.70 @ 18.30
No. 2 Strong Foundry, per ton.....	18.70 @ 17.30
No. 1 American Scotch, per ton.....	18.25 @ 18.70
No. 2 American Scotch, per ton.....	17.20 @ 17.70
No. 1 Soft Silvery, per ton.....	18.50 @ 19.00
Mahoning and Shenango Valley Neutral Mill Irons, per ton.....	16.50 @ 17.00
Mahoning and Shenango Valley Red Short Mills, per ton.....	17.50 @ 18.00

Manufactured Iron.—Common Bar at 1.70¢ is selling freely, and Sheets are in good demand at slightly advanced rates.

Scrap Iron.—Old Americans are weak and it seems improbable that the \$25 per ton rate can be much longer maintained. No. 1 Wrought is bringing \$19 @ \$19.50.

Detroit.

WILLIAM F. JARVIS & Co., under date of October 8, report as follows: Nothing of a startling nature has occurred since our report of a week ago. The volume of business has been somewhat larger and several good sized orders for Lake Superior Charcoal Iron have been booked. Most buyers have ceased to expect former quotations, but are willing to place orders at present prices for future delivery. However, very few furnacemen desire to sell for delivery after January 1st unless at an advance. The demand for high numbers of L. S. Charcoal continues, and Old Wheels are hard to secure at reasonable figures. Consumers are asking that deliveries on orders already placed be hastened, thus showing that they are using faster than was expected. For the present we quote as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.75 @ 20.25
Lake Superior Coke, cinder mixed.....	18.50 @ 19.00
Standard Ohio Black Band.....	19.75 @ 20.25
Southern No. 1.....	17.75 @ 18.25
Southern Gray Forge.....	16.25 @ 16.75
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	20.50 @ 21.50

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. }
CINCINNATI, October 8, 1888. }

Pig Iron.—The market here for Pig Iron during the past week has been quiet

—that is, the volume of business has been only moderate, but there has been an active inquiry from large as well as small buyers. Most buyers, however, have made propositions based upon the outcome of the Presidential election, which sellers have been unwilling to admit. In fact, "ifs" and "ans" have been the prominent features in the business transacted. On the 1st of October the new nomenclature of Southern Coke Iron, to conform to the grading by Northern furnaces, went into effect. A firm tone has prevailed here for all kinds and grades of Iron, but changes in prices have been few and unimportant. A few 1000-ton orders of Foundry Iron have been placed, but the majority of sales during the week were small. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$17.50 @ \$18.50
Southern Coke, No. 2.....	16.50 @ 17.50
Southern Coke, No. 3.....	15.50 @ 16.00
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	17.50 @ 18.50
Hanging Rock Charcoal, No. 1.....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.50 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @ 18.00

Forge.

Strong Neutral Coke.....	14.75 @ 15.25
Mottled Neutral Coke.....	13.75 @ 14.00
Gray Forge.....	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 23.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @ 21.50

Nails.—There has been a fair volume of business without change of importance in prices. Jobbing prices are based upon 12d @ 40d, which sell at \$2.10 per keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 per keg.

Manufactured Iron.—There has been a firm tone prevailing, with some advance realized on special kinds, with a good demand for Bar, Sheet and Structural Iron. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 34¢ @ 44¢ per lb.

Old Material.—There has been a moderate demand and an easier market for Old Rails, with moderate sales at \$23, cash, but there has been little call for Old Wheels, and prices are nominal at \$19.50, cash, here.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts. }
CHATTANOOGA, October 8, 1888. }

There is no change in the movements of general trade. Matters have assumed their usual conditions, and the late scare is practically a thing of the past. The volume of business is assuming larger proportions as the fall advances. The railroad depots are crowded with merchandise, the streets are filled with drays, and the season of activity is now fully upon us. A very noticeable feature of the business that is now being done on Southern railroads, compared to what was being done 15 or 20 years ago, is the difference in the character of the freight now to what it was then. Then whole trains of cars were loaded with cotton; now the preponderance is the products of the mines and furnaces. It is not an unusual thing now to see train after train going along with nothing but coal, coke, Ore or Pig Iron, while only occasionally a train of cotton bales; and there is also this difference: the former continues the year round, while the latter occurs only late in the fall and during early winter.

Pig Iron.—The last report practically covers the situation at present, with the

difference perhaps that there is a slight falling off in the stiffness that has prevailed during the past month or two. Sales continue to be made at past figures, but are confined more to smaller lots than heretofore, while the speculative feeling has nearly subsided. Still, the furnaces are having no trouble at all in placing their entire output. The demand from Southern consumers is assuming greater activity than ever, which shows a very healthy condition of affairs. The manufacture of Sorghum Mills is now getting to be a very large item, and many carloads are being sent through the Northwest and points in the distant West and Southwest. The rules of regrading that have lately been established by the Southern furnaces have acted as a disturbing element among many Northern agents, who heretofore have been selling Southern No. 2 as No. 1, and so billing it. In fact, the system of Southern grading operated a good deal like the magician's bottle, from which whisky, wine or brandy could be had at will. If a consumer wanted No. 1, he got it; if he wanted No. 2 he got it, but got it all out of the same pile. All the furnaces that have been relined and otherwise repaired are now turning out about 10 % more than they have ever done before, and also a much better article. The new furnaces are also working up to the satisfaction of their owners.

Louisville.

LOUISVILLE, KY., October 8, 1888.

The market has been quiet during the past week, and but few sales have been made. Prices are firm. Buyers have been compelled to pay the last advance. The tendency is slightly upward, and there is a disposition among furnacemen to ask a slight advance. If a buying movement should set in this would be easily obtained. Old Rails remain firm at \$24, Wheels at \$21.

Southern Coke, No. 1 Foundry.....	\$17.00 @	\$18.00
" " No. 2 " " " " " "	18.00 @	18.50
" " No. 2 1/2 " " " " " "	15.50 @	16.00
Hanging Rock Coke, No. 1 Foundry.....	17.25 @	17.75
Hanging Rock Charcoal, No. 1 Foundry.....	21.00 @	22.25
Southern Charcoal, No. 1 Foundry.....	18.00 @	18.50
Silver Gray, different grades.....	14.50 @	15.25
Southern Coke, No. 1 Mill, Neutral.....	14.75 @	15.25
" " No. 2 " " " " " "	13.75 @	14.75
" " No. 1 " Cold Short.....	14.25 @	14.75
" " Charcoal, No. 1 Mill.....	15.75 @	16.50
White and Mottled, different grades.....	13.50 @	13.75
Southern Car-Wheel, standard brands.....	23.00 @	24.00
Southern Car-Wheel, other brands.....	19.25 @	21.25
Hanging Rock, Cold Blast.....	22.25 @	25.25
Hanging Rock, Warm Blast.....	19.25 @	20.25

New York.

Office of The Iron Age, 66 and 68 Duane street.
NEW YORK, October 10, 1888.

American Pig.—The market is steady and firm, and in some instances more money is asked and obtained for special or fancy brands of No. 1 Foundry, which fetch from \$18.50 to \$19. Standard Irons, however, are still to be had at the old prices, at which the Thomas Iron Company are still selling. The latter have placed about 5000 to 6000 tons during the week. We are informed that the company have still Iron to sell. This is due to the fact that early in the year—in fact up to May—their customers were not taking their usual quantity, delaying and deferring deliveries, so that, coupled with a heavier output, the company have more Iron than usual to sell so late in the season. So long as these leading producers continue in the attitude of selling at old figures a general advance in the territory tributary to this market is not looked forward to. We quote: Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is quiet; with prices as high as they are now, it is a matter of some surprise that Eastern foundries do not follow the practice of their Western brethren of using more liberally high Silicon Irons, like the Norton in Kentucky and the Winona and Bessie in the Hocking Valley. We quote: Coltness, \$21.75 @ \$22, nominally; Shotts, \$20.75 @ \$21; Langloan, \$21, and Dalmellington, \$20.50, nominally.

Spiegeleisen and Ferromanganese.—We hear reports of sales of Spiegeleisen, principally 20 %, to Eastern and Western mills to the extent of upward of 5000 tons for forward delivery at about \$27, which remains the quotation. In Ferromanganese no business has been reported. It is stated that the foreign makers of Ferromanganese have formed a combination to hold up prices, but the accuracy of the report is questioned by importers, who claim that the rise is due to scarcity of Ore and high freights, and that any effort to control prices would have to rest first on the control of the Russian and Chili Ore deposits. We quote \$55 @ \$56 at tide for 80 %.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Steel Rails.—Two sales aggregating 12,000 tons are reported by two Eastern mills, the larger for a New England road, and the other for a railroad in Western New York. The latter is of special interest, because it represents one of a series of transactions brought out by the conjunction of high prices for old Iron Rails and low prices for new Steel Rails. The difference between the figures realized and paid was probably not more than \$5, inclusive of freights, so that the entire cost of relaying with steel is represented by that difference and by the cost of taking up old Iron and putting in new Steel. We understand that in this case the Iron Rails were still good for considerable service. The New England order, referred to in the above, was for winter and spring delivery, and is said to have been sharply competed for. We quote for winter deliver \$28 @ \$28.50, with rumors of sales at lower figures. We note, also, a sale of 3000 tons to a Southern road. There has been an increase of 200,000 tons in the 1888 allotment.

Wire Rods.—There have not been any sales of any consequence. An inquiry for the Pittsburgh district is in the market, but it is considered probable that it will go to a domestic mill. We quote for early shipment \$39.50 @ \$40.

Old Rails.—The market is weaker. Tees being offered at \$23.50, while the best bids are not above \$23. Business has been rendered impossible by the wide divergence in buyers' and sellers' views, and the offerings of Southern roads, two blocks, aggregating about 5000 tons, being available, have made buyers recover confidence. Considerable Old Rails have come into the market in exchange for New Rails. Thus we are told that one firm of brokers in Pittsburgh have negotiated sales of this character, aggregating fully 10,000 tons. The last of the kind mentioned is that of a road in this State who have sold 3000 tons of special quality Old Rails, still serviceable, at \$24, on line of road, and have purchased 4000 tons of New Steel Rails. Upon inquiry, we find that the difference in price between Old Rails and Muck Bar, which is considered to represent the limit where it is unprofitable

to use Old Rails, and where it pays to use Muck Bars, is about \$4 per ton. In other words, unless Old Rails are \$4 cheaper than Muck Bars, the latter are preferable. Foreign Tees are offered at \$23.50.

Fastenings.—We quote Spikes \$2.25 and Angle Bars 2.05¢ @ 2.10¢.

Cotton Ties.—Contrary to expectation, the demand has become more active, the season being late this year. We quote \$1.10 @ 1.12 ¢ bundle, New Orleans delivery.

Financial.

A severe reaction in the wheat market and a corresponding decline in breadstuffs indicate a radical change in the tone of speculation. Prices of wheat have fallen off 11¢ in two days, in a steady decline, with heavy selling orders—December weak at \$1.12. Provisions were lower, pork breaking badly on selling orders from Chicago, and lard was decidedly weak. In coffee there was a sharp advance. Cotton is dull. Raw sugars are depressed.

Nearly all markets have felt the disturbing influence of the wheat deal initiated by Chicago operators, prices for various commodities having been forced up to abnormal figures, endangering the stability of prominent mercantile firms, checking the export movement and exciting more or less apprehension concerning the future of the money market; but the consensus of opinion points to comparative ease in the immediate future. It is agreed that although the yield of wheat is below expectation, the better prices realized, together with the avails of an unprecedented corn crop, now estimated by good authorities as high as 2,210,000,000 bushels, will go far to compensate for the apparent loss. A source of satisfaction, as regards the present situation, is the settlement of most of the differences growing out of the Chicago deal without serious disaster. Taking all in all, the commercial outlook is improved. The Southern scourge is less threatening. In New York, among dry goods and grocery jobbers, with the present demand continuing, the prospects are pronounced exceedingly favorable for the remaining months of the year. Collections, aside from some delay in the South, are made with promptness. Railroads are having a remunerative traffic. The window-glass industry, employing 10,000 men, is again in full blast. The coal trade is still booming, excepting as some falling off in consumption is noticed among the iron manufacturers. Respecting the Sugar Trust, action has been taken in the Supreme Court to annul the charter of the leading refining company, upon the allegation that the combination is a criminal conspiracy under the laws of the State. On the canal, as a result of the wheat corner, the average freight rate on cereals is the lowest for any September on record, and on the lakes the lowest, with two exceptions, in 11 years.

The Stock Exchange market has been comparatively quiet, but irregular. News that the excitement in the wheat market at Chicago was subsiding had a salutary influence. Prices declined on the announcement of an advanced rate by the Bank of England, but soon recovered. On Friday the feature was a rise in New England, based on the prospective importance of the road in coal transportation. On Saturday the market was weak and lower. On Monday orders from London caused firmer prices, and Treasury purchases of bonds operated favorably, but trading was dull. On Tuesday the market was irregular but strong at the close. A special shipment of \$500,000 in gold, was regarded as of no significance.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered.....	108½
U. S. 4½s, 1891, coupon.....	108½
U. S. 4s, 1907, registered.....	129
U. S. 4s, 1907, coupon.....	129
U. S. currency 6s.....	121

The weekly bank statement showed a decrease of \$3,339,675 in surplus revenue, which now stands at \$11,417,500, against \$8,112,770 at the corresponding date last year. The special feature was the large increase in the amount of loans, equal to \$4,920,100, which is due partly to improvement in general trade but mainly to speculative activity in grain. Specie decreased \$423,200; the legal tenders are down \$1,904,600, the deposits other than United States increased \$4,047,900. A continued heavy demand for funds in the interior was offset to a large extent by purchases of bonds by the Treasury. Monday's bond purchases, aggregating \$3,783,100, made up the full requirement for the sinking fund, about \$48,000,000. The Secretary on Tuesday accepted an additional \$7,174,350. All purchases since June 30 have been applied to this purpose. Purchases from now on will be optional with the secretary, but there is reason to believe that he will pursue a liberal policy, and that undue stringency while the fall trade is in progress will be obviated. During the month of August the quotations for 4 per cents varied from 127½ to 128½, and the average rate of interest realized by purchases is computed at 2.215 %. The 4½ per cents varied from 107½ to 107½, and the rate of interest realized would average 2.188 %. Time rates for money in this market are quoted 4 @ 5 % for four and six months, but the demand is light. Rates for commercial paper are, for 60 and 90 days, 4½ @ 5½ %; longer dates 6 @ 7 %. The advance in the Bank of England rate of discount to 5 %—the highest since February last year—induced the leading drawers of sterling exchange to put up the nominal figure for demand bills to \$4.89. The posted rates are now \$4.84½ and \$4.89. The Bank of France advanced its rate to 4½ %. A London dispatch speaks of the probability of a further advance in the Bank of England rate, which, "it is calculated, will cause gold shipments from New York." The London Times says that the total shipments to Buenos Ayres will be £3,000,000. The exports of specie from New York during the week were \$425,000, and the imports \$136,000. The recent advance of about 5 % in the silver market is attributed to simultaneous orders to purchase given by several European governments. A further slight advance would bring silver from India.

Clearing-house returns now are materially increased compared with 1887, for the first time this year. The aggregate for 38 cities shows an increase of 18.9 %; outside of New York the gain is 16.1 %; New York increased 20 %; Boston, 21.3 %; Philadelphia, 7.5 %; Chicago, 39.4 %; St. Louis, 11.9 %; San Francisco, 10.9 %; Baltimore, 9.2 %; Cincinnati, 1.1 %. New Orleans, decrease, 12.5 %; St. Paul, 3.3 %; Minneapolis, 2.7 %; Memphis, 19.3 %, and Wichita, 22.7 %.

The imports of merchandise at this port during the week were valued at \$7,811,178, of which \$2,000,000 represent dry goods. Since January 1 the total is \$359,952,000, as compared with \$363,030,000 for the same time last year. The exports were \$5,887,711.

The American Bankers' Association, which has a membership of 1700, held its annual convention in Cincinnati last week, Logan C. Murray, of New York, delivering the annual address. Charles Parton, of St. Louis, was elected president and John J. Knox is chairman of the Executive Committee.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from October 1 to October 4, inclusive, and from January 1 to October 4, inclusive, were as follows:

Iron and Steel.		Oct. 1 to Oct. 4. Tons.	Jan. 1 to Oct. 4. Tons.
Pig Iron: R. F. Downing & Co.....	200	200	
Naylor & Co.....	151	6,815	
G. W. Stetson & Co.....	100	12,865	
James Williamson & Co.....	100	4,400	
Crocker Bros.....	100	9,562	
N. S. Bartlett.....	100	4,500	
Spiegelglas: Dana & Co.....	500	3,403	
Crocker Bros.....	212	5,095	
Gelsenheimer & Co.....	25	250	
Steel: W. F. Wagner.....	30	1,149	
J. Abbott & Co.....	16	464	
J. A. Coe.....	16	16	
Chas. Huggill.....	13	241½	
R. H. Wolf & Co.....	9	441	
C. F. Boker.....	4	189½	
Thos. Prosser & Son.....	2	58	
C. W. Power.....	3	52	
Steel Rods: Naylor & Co.....	226	18,257	
S. A. Galpin.....	250	2,820	
R. H. Wolf & Co.....	162	3,173	
J. A. Roebing's Sons.....	21	1,340	
Steel Rods: Naylor & Co.....	251	3,190	
Steel Forgings: Thos. Prosser & Son.....	156	3,831½	
Steel Wire: M. Cohn & Co.....	17	17	
Steel Slabs: R. F. Downing & Co.....	30	30	
Swedish Iron: Naylor & Co.....	320	420	
H. N. Holt.....	75	75	
J. Abbott & Co.....	50	6,866½	
G. Lundberg.....	11	599	
Iron Rods: Naylor & Co.....	40	595	
Rivet Rods: J. Abbott & Co.....	201	4,188	
R. F. Downing & Co.....	25	237	
G. Lundberg.....	12	458	
Charcoal Iron: Page, Newell & Co.....	56	172	
Sheet Iron: T. B. Coddington & Co.....	40	1,188	
Scrap Iron: J. H. Boothby.....	80	80	
Iron Rings: Thos. Prosser & Son.....	3	6	
Cotton Ties: Bullard & W.....	450	1,470	
Naylor & Co.....	140	5,077	
Taggers Iron: Phelps, Dodge & Co.....	105	105	

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	21,188	437,842
A. A. Thomsen & Co.....	10,341	111,426
Dickerson, Van Dusen & Co.....	6,791	216,367
N. L. Cort & Co.....	5,575	87,268
G. B. Morewood & Co.....	2,155	38,945
Central Stamping Co.....	1,867	26,979
R. Crooks & Co.....	1,589	56,123
T. B. Coddington & Co.....	1,450	182,369
S. Shepard & Co.....	1,280	17,598
H. R. Demilt & Co.....	850	16,361
Pratt Mfg. Co.....	535	137,457
Lombard, Ayres & Co.....	500	11,212
Lalanc & G. Mfg. Co.....	411	4,415
Somers Brothers.....	328	768
E. S. Wheeler & Co.....	275	6,258
H. Whittemore & Co.....	205	44,310
Merchant & Co.....	200	18,449
Smith & Lockwood.....	200	200
Bruce & Cook.....	92	79,701
C. S. Mersick & Co.....	50	5,306

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	392,719	9,276,923
American Metal Company.....	179,037	2,652,455
Jas. E. Pope, Jr.....	111,924	826,871
R. Crooks & Co.....	56,110	526,591
Knauth, Nachod & Kuhne.....	31,076	74,312
Hendricks Bros.....	27,498	367,455
D. Thomsen & Co.....	22,585	204,043
Spelter: Naylor & Co.....	166,238	472,913
Muller, Schall & Co.....	111,994	111,994
Lewisohn Bros.....	55,115	121,253
Sheet Zinc: Naylor & Co.....	112,014	212,014

	Casks.	Casks.
Antimony: Hendricks Bros.....	34	204

Irons and Metals Warehoused from October 1, to October 4, Inclusive:

	Tons.
Swedish Iron: J. Abbot & Co.....	100

Hardware, Machinery, &c.

Baldwin Bros., Gun Barrels, cs., 6	
Bernard G. Ironwork, cs., 26	
Boker, Hermann & Co., Hdw., pkgs., 49; Nails, cs., 2; Hdw., cs., 17	
Borgafeldt, Geo. & Co., Ironware, cs., 2	
Corbiere, Fellows & Co., Mch'y, cs., 6	
Downing, R. F. & Co., Iron Wheels, 26	
Engelhorn, L., Mch'y, cs., 32	
Feld, Alfred & Co., Arms, cs., 8; Percussion Caps, cs., 7	
Hall & Ruckel, Hdw., cs., 1	
Hartley & Graham, Arms, cs., 19	
Hensel, Bruckman & Co., Mch'y, cs., 1	
Inman & I. S. Co., Nails, cs., 6	
Kastor, Ad., Arms, cs., 3	
Keydel, Henry & Co., Arms, cs., 13	
Korting Gas Engine Co., Mch'y, cs., 10	
Lau, J. H. & Co., Arms, cs., 9	
Lewis & Conger, Hdw., cs., 4	
McCoy & Sanders, Hdw. and Cutlery, cs., 6	
Merchants' Despatch Co., Arms, cs., 30	
Meacham Arms Co., Arms, cs., 16	
Perez, Triano & Co., Mch'y, pcs., 3	
Powell & Clement, Arms, cs., 30	

Pim, Forwood & Co., Hdw., cs., 15
 Schoverling, A., Arms, cs., 50
 Shoverling, Daly & Gales, Arms, cs., 22
 Simpson, Spence & Young, Mch'y, cs., 5
 Thibaud Bros., Machines, bxs., 2
 Ward, Asline, Mds., cs., 4
 Wiebusch & Hilger, Arms, cs., 7; Mds., cs., 8
 Order, Mch'y, pkgs., 5; Ironware, cs., 3

Exports of Metals.

	Oct. 1 to Oct. 4. Pounds.	Jan. 1 to Oct. 4. Pounds.
Copper: J. Abbott & Co.....	11,120,619	
Lewisohn Bros.....	3,929,022	
F. A. Lomal.....	2,581,293	
American Metal Company.....	224,128	5,629,962
G. H. Nichols.....		223,899
J. Bruce Ismay.....		112,000
S. Mendel.....		500,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		480,000
Copper Queen Con. M. Com-pany.....		224,064
J. Kennedy, Tod & Co.....		112,036
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....		449,881
Robt. M. Thompson.....		126,000
Thos. J. Pope, Sons & Co.....		1,277,180
J. Parsons & Co.....		420,000
Naylor & Co.....		362,709
Bridgeport Copper Com-pany.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Ladenburg, Thalmann & Co.....		229,371
W. H. Crossman & Bro.....		4,000
R. Crooks & Co.....		1,000
Copper Matte: Williams & Terhune.....		34,382,598
Lewisohn Bros.....		3,021,610
American Metal Company.....		2,629,102
J. Abbott & Co.....		295,000
C. Ledoux & Co.....		445,800
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		180,996
Kunhardt & Co.....		41,653
Spelter: Muller, Schall & Co.....	30,000	30,000
Copper Ore: John H. Starin.....	28,000	28,000
Old Brass: Burgess & Co.....	12,071	252,466
Pig Iron: Peter Wright & Sons.....	100	480

Coal Market.

The Anthracite Coal trade is marked by the same characteristics noted for some time past. There is an easier tendency for most sizes, but prices generally are firmly held, and a fair business is in progress on the latest schedule basis. Deliveries are pressed actively, mainly in filling former orders, and in the East and interior points there is special anxiety to complete shipment while navigation remains open. Stove Coal is scarce, most of the producers being out of the market. Egg is a little stiffer. Broken and all other manufacturing sizes are easy. Pea and Buckwheat are a drag. Broken is cut a little. Altogether the trade is considered in good condition. Production is still heavy, but for the week, there is a decrease of about 60,000 tons compared with the previous week, the total being 828,636 tons, but this amount is 100,000 greater than for the corresponding week last year. Since January 1 the aggregate is 28,444,077, an increase of upward of 2,340,000 tons compared with 1887. This extra output goes West, where the demand has been unprecedented. It is estimated that the West this year will take near 2,000,000 tons. Quotations are as follows: Hard White Ash, Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Fine White Ash, Broken, \$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.55.

The production of Anthracite Coal for the year to October 6 compares with 1887 as follows:

	6,424,833	7,178,608
Schuylkill.....	5,498,008	5,541,144
Lehigh.....	16,521,236	18,378,497
Wyoming.....		

Total..... 28,444,077 26,068,234

A large contract was awarded to A. H. Church, of Ashland, by the Reading, to strip the mammoth vein at Mahonoy City Colliery. It will require one year to complete the task. Two million tons of Coal will be secured from it, and the cost will be only about one-third that of mining by the common method.

The New York Brokers' and Freighters' Exchange has been organized to promote

the general freighting interest in the harbor of New York. Officers are: O. C. Hanchett, president; Geo. W. Kellam, secretary; Thos. Dennin, treasurer.

Bituminous Coal is active on pool basis of \$3.25 f.o.b. The lack of transportation is still a cause of complaint. The growth of the trade is remarkable. Cumberland reports for the year to September 29, 2,653,000 tons, against 2,370,000 tons for the same time in 1887, and Clearfield, 2,528,000 tons, against 2,357,000 in 1887.

Metal Market.

Copper.—At the time of our last week's report, spot Chili Bars were still £96; this morning they are £82 in the London market, while futures declined from £79. 10/ to £77, and good merchantable brands from £78 to £77. 7/8, only Best Selected remaining £82, unaltered since then. The London and Continental bears having been punished, spot Bars have taken range again with other Copper. Here the dealings in Copper have almost come to a complete standstill; yesterday a local dealer sold December to the syndicate at 17½¢; the latter maintains its spot price at 17.75¢. Casting brands are bringing 16¢ with ease. It is reported from Boston that the Calumet and Hecla Stamp Mills produced in 24 hours, ended at noon on Tuesday of last week, 140 tons of mineral, the largest output for one day in the history of the mine, and yielding over 200,000 lb of Fine Copper. The total profit on this one day's output is figured at fully \$18,000.

Tin.—Has fluctuated but little in London. Spot stood a week ago £101. 15/, and has given way gradually to £100. 17/6 this morning, while futures dropped but slightly, from £101. 15/ to £101. 5/. The trade here has been quite tame, the sales on 'Change being restricted to 60 tons all told, of which 20 prompt shipment at 23¢ yesterday and 10 tons at 23.10¢. The spot price is this morning 23½¢, at which the market winds up dull. September shipments from the Straits this way were 750 tons, against 450 last year, and 1300 to England, against 1200; since January 1, respectively, 2200 tons, against 4000 tons, and 13,700 tons, against 10,000 tons. **Tin Plates.**—The market has not been quite as firm as of late; the productive capacity of South Wales is evidently gaining on consumption. The demand here has been very moderate both for spot and futures. Liverpool has given way from 14/ to 13/3 @ 13/6 with Cokes. We have to reduce to-day some of our last week's quotations, they are now as follows for large lines, per box: Siemens-Martin Steel, Charcoal finish, \$5.25 @ \$5.75; Coke finish, \$4.70; Terns, \$4.25 @ \$4.35; Bessemer Cokes, \$4.50 @ \$4.55, and Wasters, \$4.30.

Lead.—The bull speculation in Lead seems to have spent itself for the moment. On 'Change 400 tons changed hands, and 100 tons in the open market, down to 4.90¢, at which the market closes flat. Manufacturers are trying to get along as well as they can without appearing in the market as buyers, the corrodors state they need not buy for a month to come to prepare for their spring demand, and the entire situation is devoid of either life or strength. In London Soft Spanish has remained steady at £14. 10/, and English Pig at £14. 15/. The flurry there, while it lasted, we perceive from accounts by mail, was due to buying for American account. St. Louis and Chicago are both 4.90¢.

Spelter.—A moderate consumptive demand has been filled in this city at 5½¢ @ ½¢. Common Domestic, Selesian being held at 6¢ @ 6.05¢; London giving way from £19. 2/6 to £19 in the meantime.

Antimony.—A fair demand has kept Cookson at 12¼¢ and Hallett at 10¼¢; the latter is unaltered at £42 in London.

New York Metal Exchange.

The following sales are reported:

THURSDAY, October 4.	
16 tons Lead, October.....	5.00¢
16 tons Lead, October.....	4.97½¢
32 tons Lead, October.....	4.87½¢
16 tons Lead, October.....	4.92½¢
214 tons Lead, October.....	4.95¢
16 tons Lead, November.....	4.85¢
FRIDAY, October 5.	
48 tons Lead, October.....	5.05¢
16 tons Lead, October.....	5.07½¢
16 tons Spelter, spot.....	5.10¢
10 tons Tin, November.....	22.95¢
SATURDAY, October 6.	
20 tons Tin, prompt shipment.....	23.00¢
100 tons Lead, spot.....	5.10¢
MONDAY, October 8.	
10 tons Tin, November.....	23.10¢
32 tons Spelter (prime Western).....	5.10¢
TUESDAY, October 9.	
100,000 lbs. Lake Copper, December.....	17.50¢
100 tons Lead, spot.....	5¢
WEDNESDAY, October 10.	
81 tons Lead, October.....	4.90¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, Oct. 10, 1888.

The open market price for Chili Bar Copper for prompt delivery has receded £12 @ £15 during the week, but the lowest "official" price is still considerably above that at which the syndicate have made sales to consumers. The cause of the decline is doubtless the fact that there have been comparatively few "short" sales to cover this month, the "bears" doubtless being satisfied that endeavors to break the market by selling futures entangles themselves only. Consumers are said to have purchased more freely of Chili Bars the past two or three weeks than for some considerable time previous. Where satisfactory guarantee was given that the Copper purchased would go into consumption, the syndicate sold at £78 for prompt or future delivery. It is stated now that 105,000 to 110,000 tons can be located as in the hands of the syndicate. During the past month about 218 tons American Ingot have been added to the stocks in store in England. The report has circulated that the syndicate will cancel recent contracts made on payment of £20 [cable is somewhat obscure on this item.—EDITOR]. There has been a revival of reports to the effect that a new combination is forming to take up the contracts made in the name of the Société des Métaux. It is now stated that an organization known as the Société Civile is practically formed and will relieve the Société des Métaux of its obligations with the various Copper mining companies. There does not appear to be any apprehension that existing contracts will be at all unfavorably affected by the proposed transfer.

The Block-Tin market has been affected in a measure by somewhat adverse statistics, but subsequently recovered, although the demand has shown no material improvement. There is little or no change in the situation from the strictly speculative standpoint.

The demand for Tin Plate has been fairly active. Intending buyers invariably find makers indifferent, owing to the fact that their books are full, and disinclined to take any further orders of any

magnitude pending the quarterly meeting, to be held on the 11th inst. The total stock at British shipping points is returned as 191,000 boxes, against 199,750 last month and 236,000 in August. The stock last year was 199,000 boxes. The exports to America during September were 26,000 tons.

Webb, Shakspeare & Williams are adding two new establishments to their works (the Glamorgan), at Pontardulais, and will soon have a total of five mills in operation.

Scotch Pig Iron warrants have continued more or less depressed under the weight of anxiety to realize, quite heavy sales for makers' account and renewal of quite heavy storing. The decline on "warrants" has unfavorably affected the market for makers' brands. Some large sales were made early in the week, but buyers are placing very few orders at the present time. The exports of Pig Iron to the United States last month were 12,000 tons, against 10,000 in August. Prices are somewhat lower on most brands of Scotch, but no further change is reported on Middlesboro' or Bessemer Pig. Spiegeleisen is again higher, on good demand and moderate offerings.

There is no abatement of the activity in the Manufactured Iron branch and prices are very strong all through. The Staffordshire Marked Bar houses have advanced prices 10/ and Common Bars and Black Sheets are about 5/ higher. The demand for nearly all lines of Steel continues brisk, but prices show some irregularity. All late difficulties with workmen have been adjusted. On Rails there has been a partial recovery of last week's decline. Blooms, Billets, Slabs and Wire Rods are held somewhat higher.

Scotch Pig.—The market very irregular, and business smaller than previously:

No. 1 Coltness, f.o.b. Glasgow.....	50/
No. 1 Summerlee, " ".....	51/
No. 1 Gartsherrie, " ".....	47½
No. 1 Langloan, " ".....	49/
No. 1 Cambro, " ".....	43/
No. 1 Shotts, " at Leith.....	48½
No. 1 Glengarnock, " Ardrossan.....	46½
No. 1 Dalmeilington, " ".....	42½
No. 1 Eglinton, " ".....	41½

Steamer freights, Glasgow to New York, 10/ Liverpool to New York, 10/.

Cleveland Pig.—Prices without change but the market rather weak and slow. No. 1 Middlesboro', G.M.B., 37/; No. 3 do., 34/6.

Bessemer Pig.—There has been only a fair demand. Prices show little change. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen.—Demand has been more active, and a further advance in prices is asked. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—Business is of good volume and prices are firmer. Standard sections quoted at £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Blooms.—The market firm and demand good. We quote £4. 2/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Demand fairly active and the market firm. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—A moderate business, but prices firm. Bessemer, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—The demand moderate, but sellers very firm. Mild Steel

No. 6 quoted at £5. 19/6 and No. 5 at £5. 18/6, f.o.b. at N. W. England shipping point.

Old Rails.—Very little doing and prices nominal. Tees held at £3. 2/6, and Double Heads £3. 5/, f.o.b.

Scrap Iron.—A moderate business at previous prices. Heavy Wrought quoted at £2. 5/, f.o.b.

Crop Ends.—The market quiet and unchanged. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Manufactured Iron.—Market strong and active, with prices 2/6 @ 10/ higher. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars.....	£ s. d.	£ s. d.
Common.....	@ 8	2 6
Staff. Bl'k Sheet, singles.....	@ 5	5 0
Welsh Bars (f.o.b. Wales).....	@ 7	7 6
	@ 4	17 6

Tin Plate.—Business restricted by wide difference between buyers' and sellers' views. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/6 @ 16/
IC Bessemer steel, Coke finish.....	14/3 @ 14/6
IC Siemens.....	14/6 @ 14/9
IC Coke, B. V. grade.....	14/ @ 14/3
Charcoal Terne, Dean grade.....	12/6 @ 13/

Tin.—The market has been fairly active. Straits quoted at £101. 5/, spot, and £101. 10/ for three months' futures.

Copper.—Somewhat irregular market. Business moderate. Chili Bars, £78, spot, and £78. 10/ three months' futures. Best Selected, £81.

Lead.—The market quieter and not so firm. Soft Spanish, £14. 10/.

Spelter.—Demand continues good and the market firm. Silesian, ordinary, £19. 2/6.

Foreign Markets.

EQUIVALENTS

Franc, Peseta or Lira.....	Cent.
Florin (Netherlands).....	10.3
Florin (Austria).....	40.2
Escudo (Portugal).....	35.9
Escudo (Brazil).....	1.08
Mark (Germany).....	54.6
	25.8
Kilogram.....	2.205
Picul.....	134.

EAST INDIES.

SINGAPORE, August 22, 1888.—Tin.—Our last report was dated 8th inst., since when prices have fluctuated between \$34.87½ and \$37.37½, closing with sellers at \$35. Sales aggregate 400 tons, and supplies are coming to hand pretty freely. **Gum Copal.**—A small business has been done for the United States at \$11.12½ for the best quality. In **Gum Damar** nothing was done in the interval. **Tonnage.**—London rates are steady at 27/6 @ 30/ for weight. For New York via Canal there is no tonnage offering; via the Cape the Tabique will clear shortly, and the Sonntag has commenced loading; rates are unchanged. **Exchange** is steady at 3/1½ for six months' sight credits. The Tin shipments hence, so far in August, have been: Per steamer Waverley to San Francisco, 50 piculs; per steamer Glenartney to New York, 422; per steamer Bonlawers to ditto, 1683, and per ship Hoogly to Boston, 253, making total shipments since January 1 19,348 piculs.—*Giffillan, Wood & Co.*

SINGAPORE, October 4, 1888.—Tin.—The September shipments from the Straits Settlements to the United States have been 750 tons, against 450 in 1887, and to England 1300, against 1200. Since January 1 the shipments have been respectively 2200 tons against 4000, and 13,700 against 10,000.—*Giffillan, Wood & Co., to Mr. Charles Nordhaus, 89 Water street, New York, per cable direct.*

MANILA, October 1, 1888.—Hemp.—Buyers are ready to pay \$10.25, against \$11 same date last year, per picul, which equals, cost and freight per ton, £38. 17/6, against £38. 17/. The clearances to the United States since last cable amount to 10,000 bales, against 5000 in 1887, and, since January 1, to 147,000, against 159,000. There remain loading for the same destination 37,000 bales, against 56,000; cleared for England since January 1, 252,000, against 161,000; loading for ditto, 13,000, against none; cleared for all other countries, 55,000, against 30,000; receipts at all ports since last cable,

12,000, against 13,000; ditto since January 1, 400,000 bales, against 380,000 in 1887 and 305,000 in 1886. **Freight**, \$6, against \$5.50. **Exchange**, 6 months' sight, 3/5¼, against 3/8¼.—*Ker & Co., to Mr. Charles Nordhaus, 89 Water street, New York, per cable direct.*

JAPAN.

YOKOHAMA, August 15, 1888.—Petroleum.—The first cargo of Russian Refined Petroleum ever imported here direct from Batoum, per British steamer Monarch, consisted of 67,000 tins containing 536,000 gallons. It had been shipped on an order from Jardine, Matheson & Co., of China, by the Baku Commercial and Industrial Company. Upon arrival of this large supply in a lump American refined declined 5¢ per tin. This shipment is to be followed by a larger one from the same source and parties, and the competition between the two sorts will thus be permanently established, much to the benefit of consumers.—*Japan Mail.*

SPAIN

BILBAO, September 22, 1888.—Iron Ore.—Our market has been active during the week at 7/6 @ 8/ Campanil, and 6/10 @ 7/3 Rubios, with several cargoes sold besides on private terms, total shipments for the week figuring up 80,000 tons, thus aggregating since January 1 2,717,879 tons, against 3,208,436 in 1887. **Pig Iron.**—Shipments amounted to 1000 tons abroad and 830 coastwise.—*Bilbao Marítimo y Comercial.*

SWEDEN.

STOCKHOLM, September 28, 1888.—Iron Ore.—The Lulea Ofoten Railroad Company, while still negotiating with the Government to get its Steel Rails admitted duty free, now also demands that the rolling stock it requires enjoy the same privilege. There have been landed at Lulea 89 cars from England on which the duty amounts to 31,000 crowns of 28¢ American, and as the company have refused to pay the duty on the same, they have been seized by the Customs' authorities; 150 cars additional have arrived since per steamer. The company employs at present 3000 workmen, 200 of them being miners in the Iron Ore mines. There are laid so far, starting from Lulea, 218 km. of railway, 13 of which above Gellivara. Exportation of Iron Ore to date amounts to 38,000 tons. The Provincial assembly at Noerbotten voted a subsidy of 100,000 crowns six years since, and this money is now to be paid the above railroad company.—*Dagbladet.*

ITALY.

MILAN, September 27, 1888.—Iron.—A new iron works is to be founded in this city, with a share capital of 2,000,000 lire or francs, to be commenced with, but to be eventually increased. It is stated that a new process is to be introduced. The plant is to be large enough to be able to employ 500 operatives.—*La Patria.*

GERMANY.

HAMBURG, September 29, 1888.—Iron.—The demand for Pig Iron has been steady in Rhenish-Westphalia, but not active enough to prevent a gradual increase of stock. Larger orders for Spiegel have been received from the United States and elsewhere abroad, and there is an improved tendency therein in consequence. The quotation is 53 marks per ton for 10 to 12 % Manganese. Forge Pig continues dragging at 46 @ 47 marks at Siegen; rolling mills only buy to cover current requirements. Bessemer is duller, Thomas as lively as ever. English Bessemer commands 45/6 @ 46/ on the West Coast. The local inquiry for Merchant remains satisfactory, but there is none for export. The same activity as heretofore is kept up in Boiler Sheets; Thin Sheets are slightly better at 149 at Siegen. The Wire branch is also slightly looking up. Foundries, machine shops and Car works are all doing well. The foreign iron movement in Germany during the first seven months has been as follows:

	1888.	1887.
Tons.	Tons.	
Pig Iron, Scrap, Billets and Rails.....	101,940	199,902
Hardware, special Irons, Sleepers and Castings....	482,277	541,489
Totals.....	584,217	741,391
Import.		
Pig Iron, Scrap, Billets and Rails.....	116,320	84,258
Hardware, special Irons, Sleepers and Castings....	26,020	28,358
Totals.....	142,340	112,616

The import of Locomotives and Steam Engines increased from 18,199 tons to 23,266, and the export from 42,017 to 47,335. The export of Sewing Machines rose from 3827 tons to 4342. The import of Iron Ore increased from 604,548 tons in 1887 to 710,143 in 1888, and export from 992,109 to 1,257,065. **Metals.**—All metals have been steadily improving and remain firmly sustained.—*Borsenhalle.*

A New Swedish Rapid-Firing Gun.

At the Copenhagen Exhibition is shown the first specimen of a new Swedish rapid-firing gun, designed by Mr. Harald Thronsen and manufactured at the Finspong works, Sweden. This new gun is capable of firing 18 shots per minute with one man, while with two men it has a capacity of one shot every other second, or 30 shots per minute. The gun exhibited at Copenhagen has a caliber of 47 mm.; its entire length is about 52 calibers and the distance from the base of the projectile to the mouth of the barrel is 40 calibers. There are five different projectiles shown—viz., solid shot, steel shell, chilled point cast-iron shell, common shell and shrapnel, with 64 small projectiles; the weight is the same for them all—viz., about 3.3 pounds (or 1.5 kg.). The muzzle velocity is 2141 feet (657 m.) per second, with a charge of 750 grams of Swedish field-artillery powder; the maximum pressure in the barrel has been 2300 atmospheres. The mechanism is both simple and strong. The Finspong gun is mounted on a pivot carriage, so that it can be worked in all directions. It has a shoulder piece about the size of the butt end of an ordinary rifle, against which the man who works it places his right shoulder, and, with the right hand, he holds the trigger, or, if he works the gun by himself, works the lever that moves the eccentric, while the left hand rests on another lever, which, when pulled toward the man, acts as a brake and fixes the gun in any position and in all directions, so that several shots can be fired against a certain point, without it being necessary to repeat the aiming for each shot. The gun shown at Copenhagen has a screen of plate iron, but otherwise the gun is able to produce all-round fire. The material of the gun is wrought Martin steel.

The Largest Quick-Firing Gun in the World.—According to *Iron*, of London, extended trials are now being made by the naval gunnery experts of a new quick-firing gun which has a caliber of 6 inches, and is designed for projectiles weighing 100 pounds each. The gun is the invention of Sir W. G. Armstrong's firm at Elswick, and has already been exhaustively tested on their private range at Siloth. The specimen gun furnished for the naval trials has been mounted on board the Hector, an old armor-plated battleship, and some of the armor plates have been stripped off to enable a special port to be constructed which will admit of the special mounting of the gun being used to the best advantage, and will also provide security for the gunners against shell and machine gun fire from an enemy's ships. If the trials are successful, this powerful weapon will be used for the battery armament of the Nile and Trafalgar, and for the main deck batteries of the new fast cruisers, Blake and Blenheim.

Senator Wilson has been informed by Assistant-Secretary Maynard that the phraseology of Section 2510, R. S., providing for the importation in bond of "iron and steel rods, bars, spikes, nails and bolts, to be used in the construction and equipment of certain vessels," is not understood by the Treasury Department to include steel beams or what is called structural iron, but that under the regulations prescribed in pursuance of said law, steel and iron imported in shapes specified in the statute may be withdrawn for conversion into beams or other articles to be used in the construction, equipment or repair of such vessels, in which case the duties paid on the materials so withdrawn, manufactured and used are refunded in full.

Hardware.

The condition of business thus far in the present month is generally referred to as fairly satisfactory, there being a good though not exceptionally heavy trade in most lines. It is evident that the trade throughout the country are purchasing cautiously, not being disposed to exceed their near wants, and the stock of goods with both jobbers and retailers is regarded as generally light. Prices in most lines remain without change, being on nearly all staple goods the price of which is not artificially controlled, about as low as the profitable production of the goods will permit.

Barb Wire.

The New York market remains without change with a moderate business. Carload lots of Four-Point Galvanized are quoted at 3.6 cents, with about the usual advance for small lots.

The proposed organization of the Barb Wire manufacturers is understood to have been abandoned. This result was most unexpected to the gentlemen who met in Chicago on the 12th ult., by whom a plan of organization had been devised which met with the approval of every one present. All previous attempts to harmonize the trade had originated mainly with the small manufacturers, who could not secure the co-operation of the necessary number of the leading establishments, but this last effort sprung from some of the largest concerns, who were makers of the raw material as well as fencing. This fact gave the project an assurance of success, which appeared to warrant the sanguine expectations published at the time. The Barb Wire manufacturers generally were heartily disgusted at the profitless condition into which the trade had been plunged by excessive competition for business, without regard to the cost of production, and on all sides a feeling of satisfaction was expressed that a tangible method of relief had been devised. But when it was attempted to put the plan into effect an unaccountable indifference was manifested, even among those who were loudest in their expressions of approval, and the scheme was reluctantly given up. It is singular that the members of this important branch of industry are willing to allow it to continue still longer in its demoralized condition. Possibly each one feels himself able to stand the pressure until some of his competitors are obliged to drop out of the race, after which the business will right itself through the diminution of production and prices will advance to a profitable point. This seems to be the only explanation. At present the price of Plain Wire is advancing, but Barb Wire is kept down, some sellers offering the latter at a price below the cost of production by the best mills.

Wire Nails.

The existing arrangement between the leading manufacturers is reported to be working satisfactorily and prices are well maintained. The large quantity of Nails sold at the lower figures ruling previous to the recent advance enables buyers in some cases to purchase advantageously from second hands. Prices are \$2.55 for carload lots, and \$2.65 for small lots.

Cut Nails.

Although the volume of business is quite satisfactory and there are other encouraging features, the price of Cut Nails in the New York market remains still low, carload lots being available at \$1.85 on dock for Iron Nails, while Steel Nails are stiffer. Two of the mills represented in this market have lately been buyers instead of being sellers, one of them on account

of a strike. One Western mill which competed sharply, particularly at New England points, among them Springfield, Mass., has practically withdrawn, so that the number of cheap-sellers has narrowed down to a few. Nails, especially in the East, have occupied an exceptional position for some time past. While other allied industries have had the benefit of a rise—Bars, Skelp and other classes of material are above the lowest point—Nails are stationary in spite of higher raw materials. Taking the price realized on an average specification, extras included, at \$2 per keg at mill, and deducting the cost of keg, 12 cents, and cutting, 32 cents, the Iron fetches only 1.56 cents per pound. A comparison of this figure with the selling price of Bars, Skelp, &c., will show how exceptional is the position of Nails.

Miscellaneous Prices.

Last Thursday an advance was made in Shot, the present quotations being subject to a discount of 2 cents for cash in five days:

Drop Shot, per 25-pound bag.....	\$1.50
Drop Shot, per 5-pound bag.....	.35
Buck and Chilled, per 25-pound bag.....	1.75
Buck and Chilled, per 5-pound bag.....	.40

The price of Lead Pipe and Sheet Lead has also been advanced $\frac{1}{2}$ cent per pound, present prices being Pipe, $7\frac{1}{2}$ cents, and Sheet, $8\frac{1}{2}$ cents.

A meeting of the Carriage Trimmers' and Hardware Manufacturers' Association was held in the Hotel Anderson, at Pittsburgh, on Wednesday, the 3d inst. The condition of trade, which is reported to be only fair at present, was fully discussed, and the opinion prevailed that an improvement can confidently be expected at an early day. A new schedule of prices was submitted to the members, but not adopted. Some routine business was transacted, and the meeting adjourned to reconvene at the call of the secretary.

Stuart & McLean, Pittsburgh, Pa., are sending out to the Western and Southern trade circulars quoting prices on various lines of Hardware. They make a specialty of goods manufactured in and about Pittsburgh.

On the 3d inst. a meeting was held at the Grand Pacific Hotel, Chicago, of the executive and business committees of the Manufacturers' Association of Brass and Iron Steam, Gas and Water Fittings, to take action regarding a proposed increase of prices to meet the increased cost of copper. The association represents 85 per cent. of the total product annually marketed in the United States. A very thorough discussion took place in which all phases of the situation were carefully considered. It was found that some articles were being sold below the cost of production, while all others in which copper is used are marketed at a price affording but a bare margin of profit. It was determined, however, to maintain the present discount sheet until the annual meeting in New York, December 12, for the reason that the manufacturers outside the pool, representing about 15 per cent. of the product, are still keeping their goods at the present competitive rates, and the pool cannot afford to give them an advantage. Arrangements, rates and other questions were also considered, but no definite action was taken on them.

The general quotations for Wire remain without change, and there has been a withdrawal of some of the extreme prices which have recently been made by some of the manufacturers.

A disposition on the part of the manufacturers of heavy goods lying near the raw material to make slight advances is apparent, and in several lines some exceptionally low quotations have been withdrawn.

The price of the Arctic Ice Dogs, described on page 568, and manufactured by Geo. A. Waller, Seneca Falls, N. Y., is \$6 per dozen pairs, subject to a discount of $33\frac{1}{4}$ per cent.

Trade Topics.

From Fred P. Straub & Co., Evansville, Ind., we have received a carefully compiled and very interesting table relating to their purchases of goods during the 30 years in which they have been in business. From its bearing on the movement of trade and the relative positions occupied by manufacturers and jobbers in the distribution of Hardware to such representative houses, it will be of unusual interest and suggestiveness. The table, which is reproduced below, is, it will be observed, arranged so as to show the purchase of each year, and the percentage of goods purchased from manufacturers and jobbers, while at the same time it indicates the proportion purchased from Eastern and Western manufacturers and jobbers, respectively. The line of division between the East and the West passes through Buffalo and Pittsburgh, both of these markets being included in the West. In the column allowing purchases from Eastern jobbers purchases of imported Hardware are also included.

Percentage of bills purchased of—

Year.	Manufacturers.			Jobbers.		
	Eastern.	Western.	Total.	Eastern.	Western.	Total.
1858..	15	36	51	13	36	49
1859..	12	39	51	22	27	49
1860..	28	37	65	9	26	35
1861..	14	50	64	3	33	36
1862..	23	38	61	9	30	39
1863..	34	38	72	10	18	28
1864..	26	32	58	12	30	42
1865..	25	28	53	21	26	47
1866..	34	34	68	4	28	32
1867..	28	40	68	12	20	32
1868..	25	47	72	11	17	28
1869..	33	43	76	11	13	24
1870..	34	47	81	7	12	19
1871..	28	60	88	6	6	12
1872..	29	46	75	13	12	25
1873..	33	44	77	12	11	23
1874..	32	44	76	14	10	24
1875..	32	45	77	8	15	23
1876..	41	39	80	9	11	20
1877..	45	31	76	19	5	24
1878..	43	41	84	11	5	16
1879..	44	42	86	10	4	14
1880..	39	44	83	11	6	17
1881..	32	44	76	12	12	24
1882..	34	42	76	15	9	24
1883..	36	41	77	12	11	23
1884..	37	43	80	14	6	20
1885..	39	42	81	18	6	19
1886..	40	44	84	13	8	16
1887..	33	43	76	14	10	24
1888..	37	35	72	17	11	28

From this table it is evident at a glance that there has been a marked increase in the proportion of goods purchased direct from the manufacturers, with, of course, a corresponding decline in the amount of purchases from the jobbers, during the first ten years the average annual purchases from manufacturers amounting to 61 per cent., and during the last ten years to 79 per cent. It is, however, to be noticed as interesting and perhaps significant that during the present year up to date at which the table closes, September 28, the purchases from jobbers are represented by 28 per cent., the largest proportion in 20 years.

It is also interesting to notice the relation borne by manufacturers and jobbers in the East to their Western competitors, and it will be seen that the Eastern manu-

facturers have more than held their own, their average sales during the last ten years being 37 per cent., as against 24 per cent. the first ten years, a proportionate gain of more than 50 per cent, while during the last ten years the average sales by the Western manufacturers were 42 per cent., as against 37 per cent. in the first ten years, being a gain of less than 15 per cent. With reference to the purchases from the Eastern and Western jobbers, the result is, perhaps, still more surprising, there being a slight increase in the proportion of business done by those in the East, while there has been a marked decline in the proportion of purchases from their Western competitors, from whom the first ten years an average of 27 per cent. of goods was purchased, while the average has been only 8 per cent. in the last ten years.

It would obviously be unsafe to take the experience of any one house as indicating the general features of the trade, but in some points we doubt not that this table represents a quite general tendency in business, especially in regard to the increased disposition on the part of houses of like standing to purchase direct from manufacturers. With the rapid extension during recent years of manufacturing enterprises in the West, it would be surprising if, in the experience of many hardware houses, the Western manufacturers did not receive a larger proportion of business than in this instance appears to have been the case. But on this subject we shall be glad to hear from the trade, especially as relates to the tendency toward purchases from manufacturers, and whether the East is holding its former proportion of business. It is hardly to be supposed that many Hardware houses are as painstaking and systematic in analyzing and recording such matters as are the correspondents to whom we are indebted for this interesting contribution, but many of our readers who have observed the tendencies of trade are in a position to give facts and impressions which will be of general interest. The subject is a broad one, and has a practical bearing upon the business of the manufacturer, jobber and retailer.

Items.

The Iowa Farming Tool Company, Fort Madison, Iowa, have issued their illustrated catalogue, for the season 1888-1889, in the form of a beautiful light-printed pamphlet of very fine paper. Their extensive works are illustrated, their code given, and their regular line of Steel and Wood Goods, Wheelbarrows, Ox Yokes, &c., are represented. In the circular that accompanies the pamphlet they allude to the advantage of buying where a full line is made, where Snaths and Cradles and Steel Goods are all of one make and label.

The E. C. Meacham Arms Company, St. Louis, Mo., have issued, under date October 1, their catalogue No 383, in which a large line of Fire Arms and Ammunition is compactly represented. It is prefaced by a key to the quotations, which are given in characters, as usual with the company.

The Marlin Fire Arms Company, New Haven, Conn., in their 1888 catalogue call special attention to the Marlin Repeater, Model 1888, which has recently been put on the market, and also illustrates the Marlin Repeater, Model 1881, Ballard Rifles and Marlin Double-Action Revolver. Full information is given in regard to these different Arms and some related goods.

The Canton Saw Works, Canton, Ohio, in addition to their Sickle Edge Band Knives, Rolling Coulter, &c., have recently put on the market the Novel Sec-Saw and Merry-Go-Round, intended for nursery use. It is 6 feet long, supported

on an iron standard, and has a seat adapted for children only. A larger size for the lawn and play room is 8 feet long and has seats for grown persons.

Tower & Lyon, 95 Chambers street, New York, have issued a catalogue devoted to Tower's Police Equipments, showing a line of Shields, Revolvers, Clubs and Belts, Adjustable Hand Cuffs, Leg Irons and Nippers, one of which, it will be observed, is described on page 74.

Pugsley & Chapman, 8 Liberty street, New York, issue a sheet showing the goods of their manufacture together with many others, including some well-known articles.

The Hart Hardware Company have recently begun business at Lincoln, Neb., as jobbers of Shelf and Heavy Hardware. L. C. Hart is president of the company from whom it receives its name; E. P. Berryman, vice-president; A. L. Havens, secretary; J. T. Clark, treasurer; William Patterson, manager. The authorized capital is \$200,000, \$100,000 being paid up. The company will occupy rooms in the H. T. Clark building on the corner of Eighth and P. They have four floors, each 50 x 100, and below this a basement 14 feet high and 50 x 125 in size. Just at the back door is the private track belonging to the building, and from this track large shuttes lead directly into the basement for the unloading of all heavy goods. They will do an exclusively wholesale business, for which they will have the best facilities.

A new Hardware jobbing house is to be started at Omaha, Neb., on the 1st of January. It will be composed of a number of gentlemen connected with other Hardware establishments, who propose to engage in business on their own account. It is reported that it will have a capital of \$360,000, of which \$200,000 will be paid in. The name of the company has not been announced.

It is announced that George E. Bristow, of Providence, R. I., has been elected treasurer of the Nashua Lock Company, Nashua, N. H., in place of H. G. Bixby, resigned.

The Union Indurated Fibre Company, New York, issue monthly a sheet of new lines. September sheet offers Slop-Jar Mats, a line which will be readily recognized as serviceable and durable in this ware. Only one size, 21-inch, is ready. Store barrels and covers of this material are also offered in various sizes. One new size of Keelers is added, making a very complete assortment in this line, and Butter Tubs are also offered. One size only is ready, 25-pound Tub. These are described as far superior to arid much cheaper than stoneware, wooden or other new Tubs, as light, easily kept sweet and clean, not easily broken, not affected by the brine and imparting no taste to the butter.

Oliver A. Smith, Clarkston, Mich., issues a circular relating to his Iron Land Roller and also to the Dakota Roller. The special features of these implements are explained.

C. F. Guyon & Co., 97 and 99 Reade street, New York, have been appointed agents for the Middle and Southern States for the Hot-Air Registers and Ventilators manufactured by the Chicago Sewing Machine Company. The manufacturers in a recent circular call attention to a few points in the construction of these goods, mentioning among others that their Registers are of the standard measurements, thus making them interchangeable with other goods; that the position and noiseless movement secured by their patent deserves particular attention, and that the

permanent fastening is a very simple device, which can be attached at a small expense. The weight of the castings is also alluded to, as well as the fact that being made with four fans instead of three they are more easy of adjustment in dwellings.

The Twisted Wire Box Strap Company, corner Greenwich and Desbrosses streets, New York, issue a convenient pamphlet relating to their Twisted Wire Strap. A list is given of some of the principal firms using this Strap, with testimonials from a number of merchants and manufacturers, some of whom are well known to the Hardware trade.

Since their reorganization last May the Sterling Wrench Company, Sterling, Ohio, advise us that they have made improvements in the style and quality of their Wrenches, and allude to the success which they are now meeting. Their new Agricultural and Machinists' Wrench is described as having a handle like the Coes Wrench, and solid steel screw. It is intimated that still further improvements in this line are contemplated, and that a new special Wrench will soon be put on the market. Their circular mentions that, having made additions to their machinery, they now have a capacity of 50,000 per month.

By the announcement on page 56 it will be observed that the Le Page Company, Gloucester, Mass., for whom the Maltby-Henley Company, 20 Warren street, New York, are agents, are offering the Nameless Glue in trial-size packages, which are to retail at 5 cents per bottle.

Albert E. Currier, Chesterfield Factory, N. H., has issued a new illustrated catalogue and price list of his line of Auger Bits, Augers and Machine Bits. In his introductory circular he refers to the favor with which his goods have been received during the past 50 years, and alludes to their quality.

Whittier Elevator Company, 306 to 310 Eleventh avenue, New York, are putting on the market a line of Spring Mats made of wood and malleable iron, which are intended for doorways, cars, elevators, steamboats, &c. These Mats are described as made of tough elastic wooden slats molded into oval shape, forced into malleable iron cross bars, and finished in oil and coach varnish. The bars alone rest on the floor, allowing the slats to spring, and making the Mat elastic under foot.

The catalogue of the Keene Mfg. Company, Keene, N. H., illustrates their line of Long Reach Self-Adjusting Lever Club Skates. The different styles in which these goods are made are represented, and a Long Reach Lever Speed Skate is also shown. The simplicity and effectiveness of this self-fastening device are alluded to, and points are made in regard to the Skate that the grip on the sole or heel can be tightened or loosened without removing the Skate from the foot; there are no bolts, screws or other parts to lose or become loosened, and that no wrench or key is needed in adjusting the Skate.

W. J. Clark & Co., Salem, Ohio, have issued a pocket edition of their illustrated price list of Sheet Metal and Wood-working specialties. Their Elevator Buckets are prominently represented, the front cover containing an illustration of the old-style leather bucket. A variety of other goods is shown.

American Hardware in the Australasian Colonies.

A recent issue of the *Australasian Ironmonger* has a carefully prepared article on this subject, in which a general view is given of the position of American manufactures in the markets named. It deserves

careful attention from manufacturers, who will find in it suggestions and information which may be of assistance to them in their efforts to occupy or hold these fields. Omitting portions relating to machinery and other manufactures, we give the following extracts concerning Hardware and related lines:

NEW SOUTH WALES.

American Band Saws have long held a very high position here, and the Circular Saws and Vertical Saws from standard makers are making great headway.

Saw Benches, however, for ordinary lumber work, are all preferably of English make, no machine to compare with these being made in the States. The American Circular Breaking-Down Mill, with its traveling frame and adjustable head blocks for bringing up the log to the Saw, although possessing many good points for log work, is not received here with much favor, only a few comparatively being in use, and these, we understand, are principally of Canadian manufacture. The vertical breaking-down frames and also steel frames, with the exception of the few made in the colony, are all of English make, and it is unlikely America will compete in these machines, as in that country the Log Band-Saw Mill is rapidly being substituted for all other machines designed for this purpose. For circular and vertical Saws H. Disston & Sons are well known.

In *Machinery* for operating Tin Plates for preserved meat and fruit purposes, America, we should say, has the bulk of our trade. Doubtless this is due, as is the case of the wood-working machinery, to the extensive use made of the material in that country.

Weighbridges and Scales are largely imported from both countries, and although opinions seem pretty equally divided on the merits of the various machines, we think the English machines still command the readiest sale. A prejudice against the quantity of wood used in the construction of the American machine prevents its more general use, but with what show of reason we are not prepared to say.

Plated Ware.—Various consignments have been received here, but they do not meet with favor. They are too showy in style, not displaying that refined taste that the British manufactures show.

Locks, Keys and Latches of the Yale Company make have greatly come in demand of late years, all our public buildings being furnished with them. To note especially at the General Post Office the private letter boxes are all fitted with the Flat Nickel-Plated Key, which is much less cumbersome than our English-shaped Key.

Lawn Mowers of various makes are taking the place of English, being lighter, easier to handle and less costly.

In *Cheese-Making Machines* the English make are now nowhere. American are all the rage.

Axle Grease and Axle Oil is not being imported so much as formerly, that which is being made from our colonial shale being found equally as good and less costly, and is now largely used by the Public Works Department on our trams and railways.

American Hand Pumps are preferred, those of Douglas & Co.'s make having the largest sale. In Axes no question is raised as to their superiority over English make. Meat-Choppers, small Builders' Castings, Shelf Brackets, Pulleys, Sash Lifts, &c., are gradually gaining ground.

In *Agricultural Machinery* American manufactures need no comment. They are so well known and so largely advertised that we can say nothing further in their favor. The English of late have been taking a leaf out of their book, and combining lightness with strength.

NEW ZEALAND.

Next to Binders, the American implements which have had the largest sale in New Zealand are Corn Drills; of these the M'Sherry was the first introduced, and had the largest sale; next to these, and the one at present having the largest sale, is the Triumph, by Stoddart & Co. The disadvantages of the American Drill were its want of adaptability to the greater variety of grain sown in New Zealand; for instance, the Triumph is the only Drill that will satisfactorily drill peas. The American Drill also erred on the side of lightness, but, being in use at a time of year when time was not so much an object, the question of durability is though more of by farmers, and the colonial-made machine has to a large extent taken the place of the American. A large number of Horse Hay Rakes are yearly sold. The very superior lightness and

cheapness of the American nearly gives them the monopoly of this instrument. For the past three seasons a large number of Cleaning Machines, especially by Johnson & Field, have been on the market, and their low price makes them favored by farmers. They are being sold at less than half the price of the English machine. They are, however, not adapted for grass seed, which is a serious drawback to their use in many districts. In other other districts the large increase in weeds will lead to an extended sale. La Dôw's Disk Harrows had a considerable sale eight years ago, as also had the Corbin, Higganum Mfg. Corporation, but for the last four years the colonial makers, owing to their improvements, especially in transport arrangements, have nearly stopped the sale of the American. The Faurt & Bradley Sulky and Gang Ploughs were introduced, and had a small sale some years ago, and the Deere, Deere Company, was also offered, but the colonial manufactured article is so eminently superior that the remedy of consignments could not have been encouraging. A considerable number, however, of the light, handy and cheap hill-side Ploughs are sold by Otago agents. These come from various makers in the States. In milling machinery American makers have done good business, especially Barnard & Lees. These have supplied warehouse and other-sized cleaners to many of the larger grain merchants and millers. A number of various makes in Smutters, Middlings, Separators, Scalpers and other machines for the economic treatment of flour are annually imported from America for new roller mills being started in various parts of New Zealand. The breaking-down rollers themselves are generally of English or Continental manufacture.

Carriages and Carriage Material.—The strength, variety, and beauty of American timber render it invaluable to the carriage builders in the colony, and they obtain nearly the whole of their woodwork, such as bent Felloes, Naves, Spokes, Rims, Shafts, body parts, and other bend timber, from the States. A few factories bend timber, but nearly the whole of this is of American growth. Common Nut Axles and half patent come from America; other patent varieties from England. Leather for trimming and hoods is also American; the greater part also of the malleable cast and drop forged iron fittings are from the same quarter. American Coach Bolts are generally used, but an increasing number of Nettlefold's Coach and Tire Bolts are finding their way into the hands of users. Nearly all of the light harness used is of American manufacture. Hill at one time sent a large quantity to this market, but of late years cheaper qualities have had the sales. A few years ago Hooker, New Haven, and Graft, New York, sent consignments of Buggies to this market, but the result was not such as to encourage a repetition. Abbott used to be in demand when a really first-class buggy was required; for some years, however, our leading colonial makers have been turning out work quite as good and 20 per cent. cheaper than Abbott Buggies can be landed. The Jackson Wagon Company also tried a consignment of their Farm Wagons here some years ago, but they did not take.

Arrangement of Stores.

The method of accommodating Wire Cloth which is illustrated in Figs 277 and 278 is thus described by the Griffith

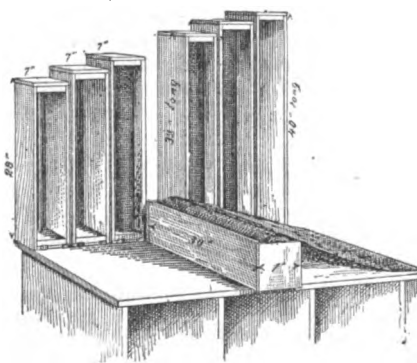


Fig. 277.—Wire-Cloth Rack.

Hardware Company, Rushville, Ill., to whom we are indebted for the matter relating to this unique and ingenious method, the convenience of which will be appreciated by the trade.

It consists of a row of boxes 6 inches square, made of $\frac{1}{4}$ -inch stuff, with double

ends. The inside piece of each end is made of 1-inch stuff and the outside of $\frac{1}{4}$ -inch, each box being 4 inches longer than the width of the Wire Cloth. The top and bottom are left open. These boxes stand on end on the rear side of the Nail counter, and are hinged at the bottom so as to drop across the counter when in use, as shown in Fig. 277. A $\frac{1}{4}$ -inch rod

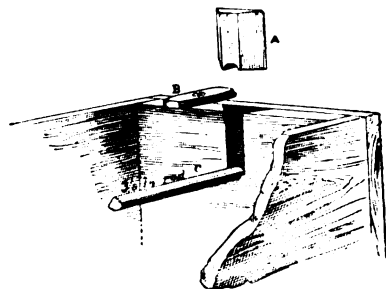


Fig. 278.—Detail of Box for Wire Cloth.

is put through the blocks usually found inside the roll, and each end rests in a slot cut in the inside piece of the end, 2 inches from the top edge when lying down on the counter, as shown in Fig. 278. The block sawed out is replaced in the slot and fastened with a turn button. To keep the block from slipping down on the roll when upright a 3-inch circular tin is nailed on the end of the block. A price card is kept on each box, giving cost and selling price per square and lineal foot, so that no figuring is necessary. Besides the more obvious advantages possessed by this method, it is to be observed that a convenient straight edge to cut by is furnished by the edge of the box.

That a great deal of ingenuity and skill have been expended upon racks for Steel Goods has been made evident by the many of which we have given descriptions in

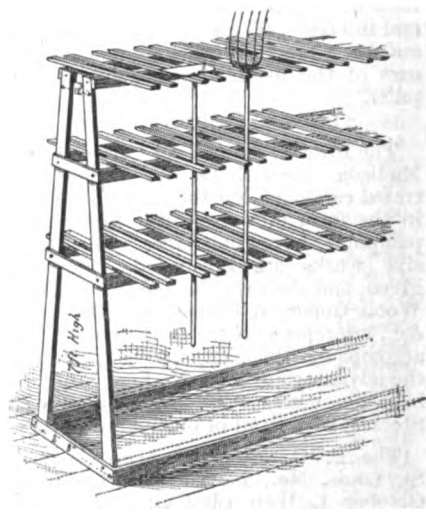


Fig. 279.—Steel Goods Rack.

this series of articles. From the variety thus presented it would seem that a Hardwareman ought to be able to find something which would answer his requirements. We have the pleasure, however, of adding to the assortment one which is in general design quite different from the prevailing type. It is illustrated in the accompanying cut, Fig. 279. We are indebted for information concerning it to Ford, Weakley & Johnston, Decatur, Ill., who describe it as follows:

The main frame is made of 1 x 4 inch lumber dressed on both sides. It is about 7 feet high, 1 foot wide at top and about 2 feet 8 inches wide at bottom. It can be made of any length desired. The cleats or cross pieces are $1\frac{1}{2}$ x $\frac{1}{2}$ inch, and extend over on either side of the rack about 7

inches. They are attached with screws and placed at least $1\frac{1}{4}$ inches apart, so as to allow the Hoes to be put in or taken out easily. Each set or pair of cross pieces should be sufficiently wide apart to prevent the Hoes being tangled with others in adjoining spaces, and there should be at least three tiers of cross pieces, so as to keep the handles perfectly straight. The Hoes when placed on the rack rest each blade above the other and each space will hold at least half a dozen Shank Hoes, so that the rack will obviously accommodate a large number of Tools. The open spaces in the center afford an excellent place in which to store Hay Fork, Hoe and Shovel Handles. By driving stout Nails at the top of the rack a good place is provided for hanging Trace Chains. The rack can also be used for Garden Rakes and Long-Handled Shovels. By putting in extra cross pieces on the middle tier an excellent D-Handle Spade and Shovel rack is provided. There should be small hooks on each end of the cross pieces to prevent the handles from slipping off. One end of the frame should be fastened to a wall or column to make it steady. The rack we have is 10 feet long, and will hold no less than 15 dozen medium Hoes

Exports.

From recent manifests we make the following abstract showing the exports in Hardware and related lines, which will be interesting as indicating the lines that are going to the markets referred to:

PER SHIP PARAMITA, SEPTEMBER 21, 1888, FOR MELBOURNE, AUSTRALIA.

By R. W. Forbes & Co.—7 cases Sporting Goods, 45 dozen Axes, 9 packages Plated-Ware, $5\frac{1}{2}$ dozen Wringers, 6 packages Choppers, 3300 Cartridges, 1 case Tricycles, 1 case Sporting Goods, 9 cases Hardware, 3 packages Hardware, 4 dozen Glue, 2 packages Hardware, 5 dozen Drills, 2 packages Hardware, 12 dozen Hammer Handles, 22 dozen Hatchets, 18 packages Hardware, 4 dozen Cow Bells, 35 dozen Axes, 90 dozen Shovels, 15,000 Cartridges, 19 packages Hardware, 100 dozen Axle Grease, 20 packages Hardware, 118 packages Carriage Woodwork.

By McLean Bros. & Rigg.—2 dozen Bush Hooks, 1 dozen Wringers, $5\frac{1}{2}$ dozen Pistols and Cartridges, 36 dozen Glue, 2 dozen Lamps, 12 dozen Fixtures, 6 dozen Fly Traps, 2 dozen Planes, 1 dozen Bench Screws, 12 dozen Axle Grease, 1 dozen Meat Choppers, 4 dozen Vises, 45 dozen Brooms, 17 dozen Saws, $\frac{1}{4}$ dozen Lawn Sprinklers, 20 kegs Nails, 1 case Butts, 19 dozen Granite-Ware, 3 Churns, 25 dozen Brackets, 28 dozen Braces, 29 dozen Vises, 30 dozen Brackets, $7\frac{1}{2}$ dozen Pumps, 32 dozen Granite-Ware, 5 dozen Lamps, &c., 1 dozen Dies, $9\frac{1}{4}$ dozen Planes, 16 dozen Gate Latches, $\frac{1}{4}$ dozen Meat Cutters.

By A. Field & Co.—20,000 Tire Bolts, 12 sets Axes, 2 dozen Carriage Furnishings, 4 dozen Sockets, 3 gross Whip Lashes, 11 dozen Harness Tools, 20 dozen Harness Ware, 3 packages Harness Ware, 9 dozen Axle Grease, $1\frac{1}{4}$ gross Harness Dressing, 9 dozen Axle Grease, 9 dozen Whips, 120 dozen Whip Handles, 5 gross Snaps, 1 case Hames, 1 box Hames, 18 Wringers, 35 dozen Harness Trimmings, 2 Creasing Machines, 1 case Harness Wheels, 3 dozen Curry Combs, 33 dozen Locks, 30 gross Pencils, 12 gross Wall Hooks, 5 dozen Hatchets, 5 dozen Spoke Shaves, 51 dozen Hooks, 1 dozen Wringers, 4 dozen Shovels, 2 dozen Locks, 10 dozen Saws.

By Tower Mfg. Company.—80 cases Slates, 5 cases Chalk, 2 cases Curry Combs, 1 case Brackets and Thermometers, 1 case Brackets, 1 case Side Brackets, 1 case Coat Racks, 2 cases Brackets, 1 case Toy Guns, 1 case Brackets.

By Mailler & Quereau.—167,000 Roofing Slates, 1750 pounds Handles, 810 pounds Handles, 40 pounds Axes, 15 cases Saws, 2 cases Vises.

By Morris, Strouse & Co.—4 gross Fly Traps, 2 dozen Money Drawers, 6 gross Fruit Jars, 6 gross Shade Rollers, $1\frac{1}{4}$ dozen Clothes Wringers, 17 dozen Hatchets, 220 gross Safety Pins, 36 dozen Whip Stocks, 24 dozen Hatchets, $1\frac{1}{4}$ dozen Clothes Wringers, 15 dozen Roller Skates, 3 gross Whisk Brooms, 132 pounds Washita Stone.

By Coombs, Crosby & Eddy.—8 dozen Hardware, 1 gross Shade Rollers, 7 dozen Shovels, 2240 pounds Bolts, 50 boxes Clothes Pins, 1 case Emery Cloth, 8 dozen Numbering Machines, 1272 dozen Nails, 24 dozen Traps, 12 dozen Wrenches.

By Arkell & Douglas.—150 dozen Brooms, 80 dozen Axes, 180 dozen Handles, 25 dozen Axes, 1-6 dozen Forges, 6 dozen Shovel Brackets, $9\frac{1}{4}$ dozen Tools, 182 Glass Jars.

By H. W. Peabody & Co.—1 case Hardware.

By W. H. Crossman & Co.—3 dozen Tills, 3 cases Lamp Goods.

By Hsley, Doubleday & Co.—3920 pounds Axle Grease, 672 pounds Axle Grease, 3 Gross Glue.

By Crane & McMahon.—30 cases Carriage-Ware, 24 bundles Carriage-Ware, 9 cases Spokes.

By Singer Mfg. Company.—609 cases Sewing Machines and Parts.

By Healy & Earl.—1 Horse-Power, 65 crates Stoves, 11 Reels, 2 boxes Bolt Cloth, 26 cases Woodworking Machinery.

By Ansonia Clock Company.—55 boxes Clocks.

By S. C. Levin & Co.—63,000 pieces Slates.

By McCoy & Sanders.—9 cases Hardware.

By Meriden Britannia Company.—4 boxes Plated-Ware.

By New Haven Clock Company.—1 case Clocks.

By White Sewing Machine Company.—28 cases Sewing Machines.

By H. P. Johnson.—2000 pounds Folding Chain.

PER BARK RUTH, SEPTEMBER 22, 1888, FOR PORT ELIZABETH, AUSTRALIA.

By New Home Sewing Machine Company.—38 crates Sewing Machines, 13 boxes Sewing Machines.

By Coombs, Crosby & Eddy.—1 dozen Irons, 32 dozen Handles, 15 dozen Axes, 30 dozen Brooms, 200 Plows, 35 dozen Tinware, 10,000 Nails, 184 Plows, 6100 pounds Nails, 4 dozen Plows, 10 cases Plow Parts, 3 Organs, 6 Washing Machines.

PER BARK JAMES G. BAIN, SEPTEMBER 24, 1888, FOR BRISBANE, AUSTRALIA.

By R. W. Cameron & Co.—11 packages Hardware, 20 Axes, 300 dozen Grease, 2 dozen Braces, 9 dozen Hardware, 2 dozen Wire Goods, 3 dozen Egg Beaters, 17 dozen Blocks, 12 dozen Hammers, 36 dozen Handles, 40 dozen Hoe Handles, 3 dozen Sad Irons, 4 gross Shade Rollers, 9 Scales, 12 Stoves, 6 dozen Saws, 1 dozen Plumbs, 30 dozen Shovels, 50 cases Clothes Pins, $3\frac{1}{4}$ dozen Churns, 15 dozen Axes, 80 dozen Axes, 10 dozen Picks, 10 Stoves, 6 dozen Axes, 2 dozen Hatchets, 4 dozen Picks, 1 dozen Bush Hooks, 1 dozen Adzes, $\frac{1}{4}$ dozen Mattocks, 20 dozen Shovels, 7 dozen Hammers, 84 dozen Chimneys, 1 box Tacks, 3 Guns, 6 Stoves, $\frac{1}{4}$ dozen Barrows, 1 package Washboards, 500 Broom Handles, 1 dozen Saws, 68 dozen Handles, 11 dozen Pumps, 7 dozen Hoes, 2 dozen Corn Shellers, 1 dozen Sluice Forks, 1 dozen Hay Forks, 10 packages Hardware, 7 Scales, $1\frac{1}{4}$ dozen Scythes, 1 box Plated Ware, 1 dozen Braces, 12 Lamps, 1 dozen Blocks, 10 dozen Hoe Handles, 2206 pounds Barb Wire, 100 pounds Staples, 1 dozen Snaths, 12 dozen Axes, 10 dozen Picks, 30 dozen Shovels, 16 dozen Saws, 24 dozen Stoves, 12 dozen Lamps, 42 dozen Hoes, 6 Lawn Mowers, 8 Corn Shellers, 8 Wood Hoppers, $1\frac{1}{4}$ dozen Grindstones, 42 sets Axes, 29 packages Carriage Material, 32 dozen Hatchets, 12 Hammers, 1 gross Shade Rollers, 15 dozen Tacks, 1 dozen Wheelbarrows, 6 dozen Washboards, 50 gross Clothes Pins, 3 Guns, 82 dozen Handles.

By Healy & Earl.—3 boxes Emery Wheels, 3 boxes Emery Machinery.

By F. B. Wheeler & Co.—16 dozen Brushes, 1 case Carts, 2 cases Clocks, 12 cases Hardware, 2 cases Forges.

By Strong & Trowbridge.—1 case Hardware, 1 case Chisels, 1 case Hammers, 3 cases Saws.

By Winchester Repeating Arms Company.—10 cases Cartridges.

By Coombs, Crosby & Eddy.—84 gross Hardware, 33 gross Axle Clips, 10 dozen Stove Parts.

By V. Basanta.—40 dozen Axes, 46 dozen Lamp Goods, 54 dozen Handles, 80 dozen Hatchets, 100 dozen Axes, 18 dozen Hoes, 19 dozen Files and Saws, $1\frac{1}{4}$ dozen Velocipedes, 200 dozen Slates, 6 dozen Hammers, 12 dozen Razor Strops, 20 Shovels, 15 dozen Wrenches, 30 dozen Hammers, 6 dozen Snaths, 1000 Broom Handles, 12 gross Clothes-Pins, 5 dozen Rolling Pins, 25 dozen Chain Seats, 24 Stoves, 3 gross Axle Grease, 2 gross Hide Whips, 1 dozen Perambulators, 21 dozen Traps, $\frac{1}{2}$ dozen Scales, 7 dozen Lamp Goods, 75 dozen Lamp Chimneys, 50 Washboards, 1 dozen sets Sad Irons, 35 dozen Electro-Plated Ware, 3 dozen Electro-Plated Ware, 26 dozen Lampware, 20 dozen Lamp Goods.

By Collins Company.—200 dozen Edge Tools, 198 dozen Edge Tools.

By New Haven Clock Company.—2 cases Clocks.

By Ansonia Clock Company.—21 cases Clocks, 12 boxes Clocks.

By E. T. Hopkins.—17 cases Lawn Mowers.

By W. H. Crossman & Bro.—15 packages Carriage-Ware, 12 packages Carriage-Ware, 42 Stoves.

By H. W. Peabody & Co.—35 packages Hardware, 1 case Lampware, 3 packages Lampware, 10 packages Pumps, 5 cases Hardware, 1 case Fire Arms, 8 cases Hardware.

By R. W. Forbes & Son.—1 box Plated Ware, 1329 pounds Carriage Bolts, 24 sets Wheels, 2 cases Carriage Hardware, 4 packages Carriage Hardware, 16 packages Agricultural Implements.

PER BARK HERBERT BLACK, SEPTEMBER 25, 1888, FOR BRISBANE, AUSTRALIA.

By C. S. Lascelles & Co.—165 packages Washboards, 200 boxes Clothes Pins, 6 crates Stoves.

By Welsh & Lea.—5 cases Iron Bolts.

By Millers Falls Company.—12 boxes Boring Machines, 7 boxes Scroll Saws, 1 box Vises, 14 Breast Drills, 23 dozen Hack Saws, 22 boxes Hardware.

By Arkell & Douglas.—44,800 pounds Wire, 20 dozen Shovels, 50 dozen Handles, 40 dozen Washboards, $2\frac{1}{4}$ gross Axle Grease, 25 dozen Axes, 200 dozen Handles, 40 dozen Hatchets, 100 dozen Shovels, 20 gross Blacking, 15 dozen Axes, 30 dozen Axes, 25 dozen Axes, 12 dozen Blocks, 40 dozen Hatchets, 75 dozen Axes, 12 dozen Axes, 10 cases Slates, 2 1-6 dozen Pumps, 245 pounds Hardware, 4 dozen Picks, 8 dozen Hatchets, 25 dozen Axes, 24 dozen Lampware, $1\frac{1}{4}$ gross Axle Grease, 6 dozen Whips, $\frac{1}{4}$ dozen Boring Machines, 700 boxes Clothes Pins, 128 dozen Handles, 1 case Wicks, 12 dozen Forks, 6 dozen Braces, 48 dozen Clips, 12 dozen Washboards, 96 dozen Handles, $\frac{1}{4}$ dozen Lawn Mowers, 12 dozen Hammers, 24 dozen Rakes, 1 dozen Churns, 360 pounds Oil Stoves, 24 dozen Hose, $2\frac{1}{4}$ dozen Chimneys, 8 Guns, 10 dozen Plated-ware, 20 dozen Hatchets, 16 dozen Picks, 5 dozen Axes, 1 case Adzes, 60 dozen Axes, 10 dozen Spades, 180 dozen Shovels, 1 dozen Hay Knives, 33 packages Axle Grease, 500 Cartridges, 24 dozen Saws, 50 dozen Axes, 51 dozen Hatchets, 18 dozen Picks, 3 dozen Pails, 1 dozen Shellers, 6 dozen Axes, 212 dozen Lamp Goods, 10 dozen Snaths, 800 pounds Castings, 1199 pounds Nails, 3 dozen Wrenches.

The Art of Buying Goods.

BY KNARF.

There are so many things contingent upon buying goods for profit that it is hard to know which to give the most prominence to—in fact, no one thing can stand out pre-eminent, as a combination of characteristics are necessary to success in this branch of business. It has been said of the fine arts, of painting, of sculpture, of music, and may be said of any vocation or business, if money-getting is the only, or prominent, object in view, the result will be failure. The love of the occupation will generally carry success with it, as the work will usually be thoroughly done, faithfully done, and done as well as the person knows how, which continued practice will lead to perfection. A man with a thorough education has, already, the advantage of an illiterate competitor, as knowledge is power; and an education, especially if coupled with observation, gives that fund of general knowledge which is indispensable in business life.

We will confine ourselves to retail buying in the Hardware, Iron and Stove trade. The taste and judgment exercised in quality and price needful in the dry goods buyer does not enter largely into our needs. The horror expressed by persons in other lines of business at our "discounts" is amusing, as they have a dread of much figuring. This same mental exertion gives us men of minds, minds as thoroughly disciplined as that of a college graduate, if our buyer is conversant with Hardware business in its various departments.

The ease with which buying is done at the present time contrasts forcibly with the time and labor necessary to buy a six months' supply of goods of 40 years ago. The merchant found his way to Chicago then as best he could from his home. From there by lake, canal and stage to Albany and by the river from there to New York. Now the retailer has quite an extensive library of large, handsomely bound catalogues from the manufacturers and jobbers, with almost every article illustrated,

and, in most cases, a universal price list on each class of goods of corresponding grade and class. Comparative lists of Locks aid in selecting the same style of some other make, and telegraph cipher condenses a large order into the ten-word limit. The facilities for buying goods have kept pace with the numerous other improvements in doing business.

The old adage that "Goods well bought were half sold" still holds good, not only in price, but also in quality, quantity and desirability for your local trade. The drummer may be looked upon as a necessary evil, or a blessing, according to the man; but the merchant and the drummer are of mutual benefit to each other, and every traveling man should be entitled to a courteous reception and subsequent considerate treatment, until he makes himself so obnoxious you can't stand it any longer, then fire him. For change in prices, new goods and a hundred and one other points of information, we are dependent upon him. So treat him nicely. A thorough perusal of all price currents, advertising leaflets, and such matter as may come through the mail to you, is well worth the time spent. If nothing shows itself of immediate advantage to you, there are points to make memorandum of, and cuts you will need some time, that should be transferred to an indexed scrap-book. The next man who comes in may want just what you saw on a circular, and now the boy is using that circular to clean a lamp chimney with. A short time spent in conversation with each salesman will generally give you enough new information regarding his line of goods to pay for the time spent. Let it be understood, when you say you do not want any goods this trip, you mean it. This knowing your wants will save you much annoyance by men hanging around the store, expecting to urge or worry you into buying a bill. It always reminds me of caged lions to see a drummer follow the merchant back and forth, up and down the store, one on either side the counter, trying to sell him goods, which the undecided answer of the merchant gives him hopes of doing. Always have a "want book," and when out of anything or nearly out, see it gets set down as a memorandum to buy by. Toiling through a 1000 or 1200 page catalogue with each traveler, and being asked at each page, "Do you want this?" is not what it is cracked up to be; it is time wasting and temper trying. After a want book, the next most important thing is some convenient and accurate plan of keeping prices. There are more than enough things to remember, without burdening your mind with things that can be committed to paper. Discounts on Bolts, Screws, &c.; staple goods can be remembered, as you are buying frequently, but the great mass of prices, many of them net, is too much rubbish to burden the mind with; and in most cases you are not sure enough of their being correct to say you are right, and be wrong in the price. Some houses instruct their traveling men to make low prices on Staples, and to more than make up the loss of profits on Shelf Goods or Fancy Hardware. You want to be posted for these fellows. A copy of the order should always be retained. Some people have a way of "stuffing" orders, or the house may consider prices on some articles too low, billing those goods higher than the agreed price. A salesman's name attached to an order is the surest way of getting the required rebate. Goods may arrive before the invoice does, and may be checked off from the copy of order, saving time, getting the goods out of the way of light fingered people, or enabling the price to be set on some article a customer wants at once. Always be in a position to know the correct buying and selling price of each article.

It is safe to presume that the quantity of any class of goods may be increased a little over the previous year's purchase, to accommodate an increasing trade in season goods. There may be failure in crops, financial disturbance at large, or some unlooked-for reason why trade in general is not good; in such a case misery has company in your competitors. A good assortment of any line is better than all of a kind. The ready excuse of those purchasers who give their own town the go-by and buy goods in some larger town or city is, "We had a better assortment to choose from." When you get an assortment that satisfies your trade, keep it up; don't run out of goods. The article that you are tired of seeing on your shelf, and that you have been trying to get rid of for six months or a year, is no sooner sold and you congratulate yourself that it is gone, than the next customer wants the same thing. If you are carrying any particular line of goods and people know that you make a specialty of them, keep it well up, even if you make a special order for it.

When ordering one article for a customer it is often well to order an extra one for stock; some retailers make it a rule to always do this, and generally to their profit. While a new thing brings a good price while new, it is well to be conservative in the practice of being the first to introduce new goods; it is safer to wait until a demand has been created for them. Adjustable Pot Covers, for instance, probably had the largest sale of any article recently put on the market, because buyers thought them saleable and that there would be a demand for them; I know of nothing that you will find on hand so near the original amount purchased as these same Adjustable Pot Covers.

Your store could soon be filled up with goods having no better selling qualities because they don't take. Wait for the demand. When a house retails from \$15,000 to \$20,000 worth of goods a year there comes the feeling that goods must be bought from manufacturers instead of jobbers. The manufacturer gladly quotes prices, but to secure 5 per cent. to 10 per cent advantage in cost a certain quantity must be taken, which is much in excess of your former purchases in any one line. You overload yourself, while your competitor with less means buys less and has his nimble sixpence ready to invest again, while your capital is locked up in goods you are carrying over. A large number of the yearly failures may be traced to buying in too large quantities. With the facilities for getting goods in a short time little excuse exists for imposing on yourself. Under these existing circumstances it is injudicious to buy for future delivery to satisfy the traveling man, "so the house may know he has called on you," unless it is season goods that are ordered. When season goods are presented by the salesman, even though it be six months ahead, then is the time to talk about them. He has prices, styles and information at his tongue's end then. If not bought then you may not think of them again until the time for showing them arrives, and traveling men, supposing you have bought, will not think of offering them later. By this time stocks in jobbers' hands will be broken, and some early bird can't wait until you order for him, and there you are.

The class of goods bought, the quality, depends upon your trade. The style will depend upon your location in the country. A Michigan pattern Axe would be dead stock in Missouri, and the same style in handle and blade of a Pocket-Knife would not suit a Northern and Southern man. In buying a line of goods it is usually safe to buy one article that is high priced. You can probably get cost for it; it makes a show and makes talk, which is good ad-

vertising, besides giving a good assortment. With some customers nothing on earth is too good for them, until they hear the price, when you can make a sale of one of the cheaper ones. Some are always crying low prices, and, as contradictory as the statement may seem, low prices are not desirable. More money is made when goods are high than when they are low. If certain per cents are added to goods that you sell \$20,000 of during one year, and the cost of the same class and quantity of goods is less the succeeding year, the net profits will be less, if figured at the same per cents to arrive at the selling price. A larger quantity of goods will also have to be sold to make the sales reach \$20,000. So a low price on goods is not desirable. Sometimes goods may be presented in such a way that you will find it desirable to purchase after you have positively declined doing so. If it will be to your advantage do not be too proud to change your mind. Even if you are full of a line of goods, inquire the price, as there may be an advance you want to take advantage of in selling, or there may be a decline in price you will want to meet, and not have your stock left on your shelves by your competitors selling them lower. You may think at the time he is a fool and is losing on this line when he is in reality making a good profit at the decline in cost.

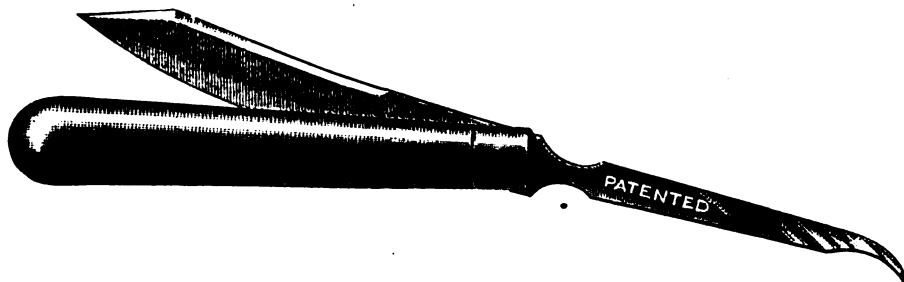
The Union Indurated Fibre Company, of New York, have recently shipped some 50,000 feet of their pipe to the Bell Telephone Company, of Philadelphia. This is now being laid in Market street, and so much to the satisfaction of the telephone company that we understood that they were ready to place an order for some 200,000 feet more which the fibre company were obliged to decline on account of their inability to deliver rapidly enough. The pipe is pressed out from wood fiber, and treated so as to render it impervious. Its advantages for underground work are obvious. The company have recently received a letter from General Greely of the Signal Service, relative to the merits of fiberite battery jars furnished the department. These jars are reported upon by Lieut. Frank Greene, of the Signal Corps, in charge of the telegraph division. Lieutenant Greene considers that these fiberite battery jars will make an excellent substitute for the glass ones which have been in use, as they will always retain their shape, are much easier to keep clean and renew, and are not liable to breakage from freezing or violence in transit.

According to the Roanoke, Va., *Evening Telegram*, the pay-roll for the month of August at the Roanoke Machine Works amounted to over \$50,000. The roll shows that 1120 men were employed at the time, and the force is constantly being increased. The immense extent and capacity of these works can be judged from these figures. Less than six years ago Roanoke itself had barely 400 inhabitants.

The Chicago Forge and Bolt Company, Chicago, are making a new car of iron and steel for brickmakers' use, which possesses features of value. The journals consist of friction rollers, enabling a very heavy load of bricks to be pushed with ease by hand. The body of the car is made of a channel bar bent to form a square frame, to which the wheel seats are bolted. The car is loaded with green brick and pushed into the kiln, remaining without injury until its load is sufficiently burned, thus economizing labor in handling the brick. The rollers on which the car axles revolve were the chief difficulty in constructing these cars, and exhaustive experiments were made in perfecting them, to secure a pattern which would work satisfactorily after exposure to the intense heat of a kiln.

The Empire Fruit Knife and Nut Pick.

The Empire Knife Company, West Winsted, Conn., are putting on the market the novelty named above and represented in the illustration herewith given, which, however, fails to represent the attractiveness of the handle, which in the sample we have seen is a floral design in oxidized and bright plate. The illustration represents the article full size. The



The Empire Fruit Knife and Nut Pick.

fruit blade and the nut pick are of one piece, the one shutting into the handle while the other is in service and *vice versa*, thus making a most convenient and dainty knife and pick. The advantage of having the fruit knife and nut pick together and not in separate pieces is alluded to by the manufacturers, as well as its convenience for home use for the parlor and for daily service. It is guaranteed 12-ounce silver plated. Each knife and pick is put up in a plush case, which is inclosed in a card box.

The Adams Oil Can.

The Adams & Westlake Company, of Chicago, are putting on the market a new can for holding oil and gasoline which they have named the Adams. The accompanying cut is an excellent representation of it. It is made of IXX steel plate. It has a wooden bottom and a retinned wrought-iron spout, and is not easily bruised or dented. It is fitted with a pump for the easy extraction of the con-



tents, and the top of the can is sunk to catch a possible overflow. The spout adjusts itself to the height of a lamp or other receptacle placed under it to be filled. The slot for filling is air-tight, so that no loss by evaporation will occur. The can is ornamented by the company's oxidizing process and is furnished in assorted colors, forming a pleasing contrast with the silver finish of the tin plate. Two sizes are made,

one holding 8 gallons and one 5 gallons. They are packed for shipping in racks of a half dozen.

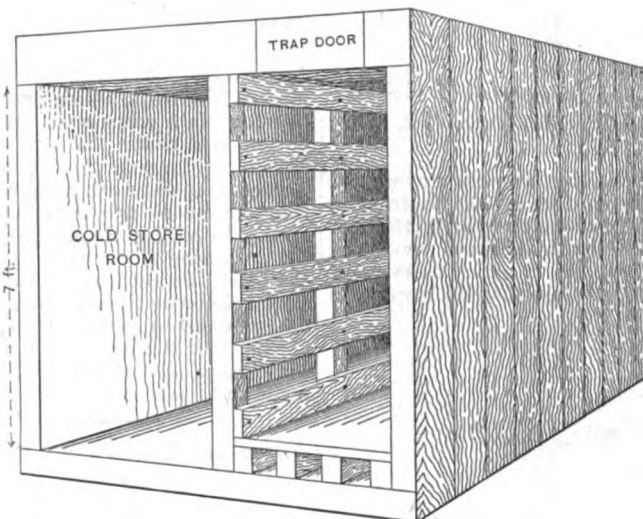
A Basement Refrigerator.

A correspondent in Boston writes to us as follows: "Some years ago the writer was asked for a plan of a cooling room to be made in the basement or cellar, under a grocery store. The proprietor of the store was a large buyer of butter and other

products from the farmers, and the ordinary ice box in the store was found to be too small, and there was no room for a larger one, so it was resolved to build a refrigerator in the basement. The inclosed drawing is intended to explain the general features of construction, and while there may be nothing novel or original about the affair, it may offer some useful hints to some of the readers of *The Iron Age*. The mat-

with sliding doors at top and bottom so a current of cold air could be produced from the ice. When ice is kept on top of the storeroom, it is difficult to prevent the condensed moisture from dripping into the articles below, without interfering with some of the numerous patents now in force, as the writer knows from experience. The bottom and sides of ice-room should be covered with metal so as to catch the water, a pipe with trap being provided to take it away. Any suitable grating can be made to prevent the ice from injuring the metal bottom."

The Supply of Natural Gas.—There is no failure in the supply of natural gas. This is the point made by the *Pittsburgh Times*, by whom many facts are cited in support of the position. The editor concedes that great gushers are diminishing in districts where additional wells are drilled, but new developments more than offset the loss in these special instances. Natural gas operators, we are told, all admit that the gas is failing in some fields in the sense that the first wells in a territory had a greater pressure when struck than they have now. A number admit that the great volume of gas taken from such fields as Murrysburg has lessened the flow, and are not surprised. But they hold that the new territory being developed will produce more than the equivalent of the failure in the first fields. Numbers of great gushers, such as those at Bellevue, have not yet been brought into use. Natural gas experts agree that the present generation need not worry over the fuel



A Basement Refrigerator.

ter of size and material would depend upon circumstances; for example, where sawdust is plenty that material could be used to fill the exterior double walls. If this material is not at hand, a liberal use of building paper or asbestos sheathing would secure the desired result of making the walls as near non-conductors of heat as possible. The door to the cold storeroom and to the ice-room can be placed where most convenient, and should be made double, like the walls. It might be a good plan to have a trap door in the floor above, then the cakes of ice could be lowered by means of a rope. If the inner walls of the cold room are covered with zinc or galvanized iron, and a ventilating pipe is put in at the bottom, butter and such articles could be kept very nicely. Since butter absorbs odors very rapidly, great care has to be taken in the manufacture and use of refrigerators on this account. It is not pleasant to have butter taste like a pine board, as it might if kept in a box lined with pine. The metal partition between the ice and storeroom might be provided

supply, as none will live to see the natural gas supply give out. But, they argue, if it should fail, fuel gas can be furnished under patents of Pittsburghers at a mere trifle more than the cost of natural gas. This being the case, and Pittsburgh's fuel gas system is a tried certainty, the bugaboo of fuel failure in Gasdom held up by envious Eastern cities, is of no consequence.

The Corinth Canal.—One of the oldest engineering projects in the world is now gradually approaching completion, and the work will probably be finished during the coming year. This is the canal through the Isthmus of Corinth, in Greece, which was first planned some 25 centuries ago, and on which work was actually begun under the Emperor Nero, so that over 1700 years will have passed between its beginning and its final completion. As finally excavated the canal will be 4 miles long, with a depth of 8 m., or sufficient for the largest vessels which usually navigate the adjacent seas. The total cost

of the canal will be about \$9,000,000, or \$4,000,000 more than the original estimate.

Star Steel Fence Posts.

Oliver Bros. & Phillips, Pittsburgh, Pa., are manufacturing a line of steel fence posts, which they designate as the Star. They are illustrated in the accompanying

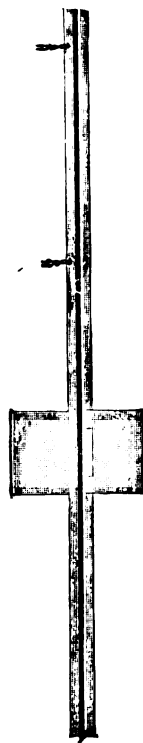


Fig. 1.—Star Steel Fence Post.

cuts, Fig. 1 showing a portion of a post, indicating the manner of its construction and the way in which the wire is attached, while Fig. 2 gives a sectional view, full size. The low price at which these goods are furnished, the fact that no staples are

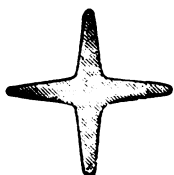


Fig. 2.—Sectional View of Fence Post.

required, and the ease with which the fence is constructed, are points made in their favor. It is suggested by the manufacturers that wooden posts be used every 100 feet, steel posts in between, making a

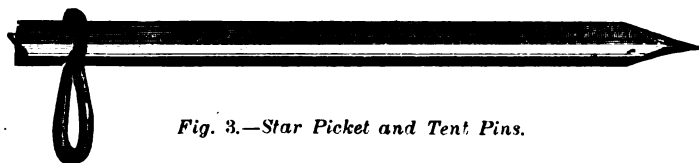


Fig. 3.—Star Picket and Tent Pins.

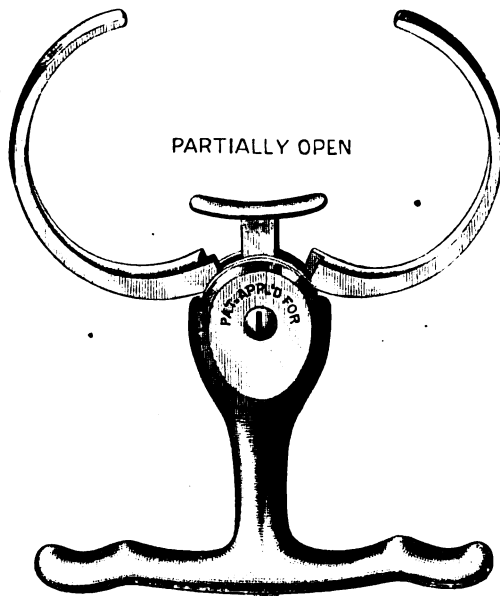
light, handsome fence. Fig. 3 shows the Star picket and tent pins, which are formed, it will be observed, on the same principle.

In all the prairie regions where timber is scarce, there is always trouble keeping in a supply of fire-wood for starting the fires of locomotives. They manage that business at the Wabash Western shops, at Moberly, Mo., in a way that is worthy of

imitation by other roads. All the worn out ties along the line of the road are brought here, cut up by contract for 50 cents a cord, and the wood is said to be as good for firing up as ordinary fire-wood that costs \$3 or \$4 a cord.

Thomas' Automatic Police Nippers.

This article, which is put on the market by Tower & Lyon, 95 Chambers street, New York, is represented in the illustra-



Thomas' Automatic Police Nippers.

tion, which in a general way indicates its special features. When the nippers are closed a slight pressure on the projecting button, seen under the handle, opens the nippers, at the same time forcing the projecting piece outward, as shown in the cut, which represents the implement partially open. In putting the nippers on the wrist the projecting piece comes in contact with the wrist, thereby automatically closing it, and at the same time locking it, it being only released by pressing on the button as above. It is thus referred to as automatic, self-closing and self-locking. It is well-made and finished in nickel plate.

Senator Sherman on Commercial Union.

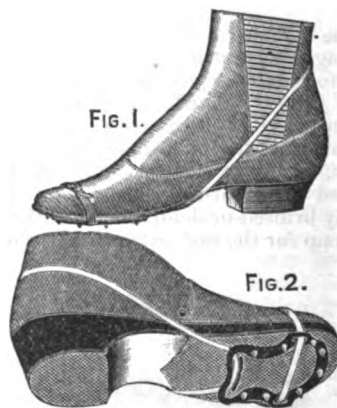
Senator Sherman gives free expression to his views in favor of commercial and political union with Canada. "It is true," he says, "that commercial union tends to increase trade, and yet political union is the only thing that can bring about absolute reciprocity of trade and communion of interests." Again, "If you have exactly the same

duty the prices would be just the same, and nothing would be gained by smuggling. There are more than 1,000,000 native Canadians living in the United States, and citizens of the United States have more than \$100,000,000 of capital invested in Canada. The similarity of the people in language, descent, habits and institutions makes union easy and natural. The lines of commerce from Canada to this country are lines of longitude and not of

latitude. The coal of Nova Scotia is shipped to New England and the anthracite of British Columbia is needed in California. Ohio sends her coal to Ontario cheaper than Nova Scotia or British Columbia can. The iron, copper, nickel, silver and lumber of Canada north of the lakes are more easily transported to populous regions like Chicago and Buffalo than in any other direction. They will not bear transportation to England, as the cost is too great. Canada wants our markets and the United States wants her natural resources. All the products of Manitoba and the Northwestern Territory naturally follow the valley into Minnesota and Dakota. It is a fight with nature to carry those products east or west over the mountains. The maritime provinces of Canada have their natural outlet and market in New England, which can furnish them capital and enterprise. The United States will find in these provinces what the United States needs, a real nursery for seamen. The provinces will fall heir to all the fisheries of New England without dispute or contention. I know of no province or section but would gain largely by union without losing any local advantage it now possesses."

Arctic Ice Dogs.

The accompanying illustrations represent the special features of the line of ice dogs or creepers which are patented and put on the market by George A. Waller, Seneca Falls, N. Y. It will be seen that they consist of a light malleable casting which fits to the sole of the shoe and is fastened to the foot by means of a toe strap and an endless elastic band drawn high over the heel, thus holding the dog to its



Arctic Ice Dogs.

place. It is obvious that thus attached they are easy of adjustment and quickly put on or taken off. Their simplicity and security are alluded to by the manufacturer. They are made in two sizes, for ladies and gentlemen, respectively, and the point is emphasized that the manner in which they are fastened to the foot adapts them equally well for use with boots, shoes or rubbers. They are intended to retail for 50 cents per pair.

It may not be without interest to our readers to know that arrangements are at present being made for the introduction in the United States of the Serpollet capillary steam boiler, briefly described in *The Iron Age* a few weeks ago. One of the boilers is now on exhibition in New York at the establishment of the American Gas Saving Company, 733 Broadway.

There are 21 cotton mills in Japan, the number having more than doubled during the past two years.

CURRENT HARDWARE PRICES.

OCTOBER 10, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Caps, Percussion, 7000—

Hicks & Goldmark's	
F. L. Waterproof, 1-10's	50¢
B. B. Trimmer, 1-10's	50¢
B. B. Ground Edge, Central Fire, 1-10's	75¢
Double Waterproof, 1-10's	50¢
Market Waterproof, 1-10's	50¢
G. D.	30¢
A. B.	30¢

Union Metallic Cartridge Co.

F. O. Trimmer	50¢
F. L. Ground	50¢
Can. Fire Ground	70¢
Double Waterproof, 1-10's	50¢
Double Waterproof, 1-10's	50¢
B. B. Genuine Imported	45¢
Wiley's B. B.	50¢
Wiley's D. Waterproof, Central Fire	50¢

Cartridges

Rim Fire Cartridges	dis 50¢ & 55¢
Rim Fire Military	dis 15¢ & 20¢
Central Fire Pistol and Rifle	dis 25¢ & 30¢
Central Fire Military & Sporting	dis 15¢ & 20¢
Blank Cartridges, except 22 and 32 cal., an additional 10% over above discounts.	
Blank Cartridges, 22 cal.	\$1.75, dis 2¢
Blank Cartridges, 32 cal.	\$3.50, dis 2¢
Primed Sheets and Bullets	dis 15¢ & 20¢
B. B. Caps, Round Ball	\$1.75, dis 2¢
B. B. Caps, Conical Ball, Swaged	\$2.00, dis 2¢

Primers

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells)	\$1.00, dis 2¢
All other Primers, all sizes	\$1.20, dis 2¢

Shells

First quality, 4, 8, 10 and 12 gauge, dis 25¢ & 30¢	
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30¢ & 35¢
Star, Club, Rival and 10 gauge, \$9 list	dis 35¢
Climax Brands, 12 gauge, \$8 list	dis 30¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢ & 35¢
Seibold's Combination Shot Shells	dis 15¢ & 20¢
Brass Shot Shells, 1st quality	dis 60¢ & 65¢
Brass Shot Shells, Club, Rival, Climax	dis 65¢ & 70¢
A. B. & C. Co., I. X. L., 10 & 12 gauge	dis 40¢ & 45¢
A. B. & C. Co., "Special," 10 & 12 gauge	dis 30¢ & 35¢
A. B. & C. Co., "Special," 10 & 12 gauge	dis 40¢ & 45¢
Fowler's Patent, 10 & 12 gauge, \$100	\$3.75

Shells Loaded

List No. 10, 1887	dis 20 & 10¢
U. M. C. & W. R. A. — B. E., 11 up	\$2.00
U. M. C. & W. R. A. — B. E., 9 & 10	2.30
U. M. C. & W. R. A. — B. E., 7 & 8	2.60
U. M. C. & W. R. A. — B. E., 11 up	8.10
U. M. C. & W. R. A. — B. E., 9 & 10	4.00
U. M. C. & W. R. A. — B. E., 7 & 8	4.90
Wiley's B. E., 11 up	\$1.75
Wiley's P. E., 11 & 20	\$2.80
Anvils — Eagle Anvils	\$100, dis 20 & 25¢
Peter Wright's	35¢
Armstrong's Mouse Hole	35¢
Armstrong's Mouse Hole, Extra	\$4.15
Trenton	35¢
Wilkinson's	35¢
J. & Bailey Carr. Patent Solid	\$11.15
Anvil Vise and Drill	
Millers Falls Co.	\$18.00, dis 20¢
Cheney Anvil and Vise	dis 25¢
Allen Combining Anvil and Vise	\$5, dis 40¢ & 10¢
Moore & Barnes Mfg. Co.	dis 35¢

Augers and Bits.

Douglas Mfg. Co.	
New Haven Copper Co.	
Wm. A. Ives & Co.	dis 70¢
Hamphreysville Mfg. Co.	
French, Swift & Co. (F. H. Beecher)	
Cook's, Douglas Mfg. Co.	dis 55¢
Cook's, New Haven Copper Co.	dis 50¢ & 55¢ & 60¢
Ives' Circular Lip	dis 60¢
Patent Solid Head	dis 80¢
E. Jennings & Co., No. 30, extension lip	dis 40¢
O. E. Jennings & Co., No. 30	dis 60¢
O. E. Jennings & Co., Auger Bits, in fancy boxes	dis 20¢
Set, 3/4" quarters, No. 5, \$5; No. 30, \$5	dis 20¢
Lewis' Patent Single Twist	dis 45¢
Russell Jennings' Augers and Bits	dis 25¢
Imitation Jennings' Bits (new list)	dis 60¢ & 65¢
Fugh's Black	dis 25¢
Car Bits	dis 50¢ & 60¢
L'Hommedieu Car Bits	dis 15¢ & 10¢
Forster Pat. Auger Bits	dis 10¢
Yellow Augers	
Ives	dis 25¢ & 30¢
French, Swift & Co.	dis 25¢ & 30¢
Douglas	dis 40¢ & 45¢
Bonney's Adjustable \$ per doz.	dis 40¢ & 45¢
Stearns	dis 20¢ & 25¢
Ives' Expansive, each \$4.50	dis 30¢
Universal Expansive, each \$4.50	dis 30¢
Wood's	dis 25¢ & 30¢

Expansive Bits

Clark's small, \$15; large, \$30	dis 25¢ & 35¢
Ives' No. 4, per doz.	dis 25¢ & 30¢
Swan's	dis 40¢
Stearns, No. 1, \$25; No. 2, \$35	dis 35¢
Stearns' No. 2, \$45	dis 20¢

Chisel Bits

Common	\$ gross \$2.75 — \$3.25
Diamond	\$ gross \$1.10 — dis 50¢ & 55¢
"Bee"	dis 45¢ & 50¢
Double Cut, Shepherdson's	dis 45¢ & 50¢
Double Cut, Ct. Valley Mfg. Co.	dis 30¢ & 35¢
Double Cut, Hartwell's, \$ gross	dis 35¢
Double Cut, Douglas	dis 40¢ & 45¢
Double Cut, Ives	dis 60¢ & 65¢

St. Stock Drills

Horse Twist Drills	dis 50¢ & 55¢
Standard	dis 50¢ & 55¢
Cleveland	dis 50¢ & 55¢
Syracuse, for metal	dis 50¢ & 55¢
Syracuse, for wood (wood list)	dis 30¢ & 35¢
Williams' or Holt's, for metal	dis 50¢ & 55¢
Williams' or Holt's, for wood	dis 40¢ & 45¢

Ship Augers and Bits

L'Hommedieu's	dis 15¢ & 10¢
Watrous's	dis 15¢ & 10¢
Snell's	dis 15¢ & 10¢
Snell's Ship Auger Pat'n Car Bits	dis 15¢ & 10¢

Awl Blades

Sewing, Brass Ferrule	\$3.50 \$ gross — dis 45¢ & 50¢
Patent Sewing, Short	\$1.00 \$ gross — dis 40¢ & 45¢
Patent Sewing, Long	\$1.30 \$ gross — net

Patent Peg, Plain Top

Patent Peg, Leather Top, \$12.00 \$ gross — dis 45¢ & 50¢

Awls, Brad Sets, &c.	
Awls, Sewing, Common	\$ gross \$1.70 — dis 35¢
Awls, Shouldered Peg	\$ gross \$2.45 — dis 40¢ & 45¢
Awls, Patent Peg	\$ gross \$3.45 — dis 40¢ & 45¢
Awls, Shouldered Brad	\$2.70 \$ gross — dis 35¢
Awls, Handled Brad	\$7.50 \$ gross — dis 45¢
Awls, Handled Scratch	\$7.50 \$ gross — dis 45¢
Awls, Socket Scratch	\$1.50 \$ gross — dis 25¢ & 30¢

Awls and Tool Bits

Allen's A. W. & Tool, No. 20	\$10.00 — dis 50¢ & 55¢
Tray's Ad. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$8	dis 25¢ & 30¢
Miller's Falls Ad. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$8	dis 25¢ & 30¢
Henry's Combination Haft	\$ doz. \$3
Brad Sets, No. 42, \$10.50; No. 43, \$12.50	dis 70¢ & 75¢
Brad Sets, Stanley's Excelsior, No. 1, \$7.50	dis 30¢ & 35¢
Brad Sets, Stanley's Excelsior, No. 3, \$5.50	dis 30¢ & 35¢

Axes

Makers' and Special Brands—

First quality	\$ doz. \$6.00 — \$6.50
Others	\$ doz. \$5.50 — \$5.75

Axle Greases

Fraser's, in bulk	Keg \$ 4; Pail, \$ 5; net
Fraser's, in boxes	\$ gross \$5.50
Dixon's Everlasting, in bxs., \$ doz. 1 lb.	\$1.20; 2 lb. \$2
Dixon's Everlasting, 10-lb pails, each \$5	
Lower grades, special brands	\$ gross \$5.50 — \$7

Axles

Axles.—No. 1, 4¢ @ 4½¢; No. 2, 5¢ @ 5½¢,	
Nos. 7 to 18.....	dis 50@55 ¢
Nos. 19 to 23.....	dis 60&10&10@70 ¢

Climax Steel Anti-Friction......dis 50
Zenith for Wood Track.....dis 55
Reed's Steel Arm.....dis 60
Challenge, Harn Dor.....dis 60
Sterling Improved (Anti-Friction).....dis 50
Victor, No. 1, \$18; No. 2, \$10.50; No. 3, \$18.....dis 50
Kidder.....dis 50
The "Boss".....dis 60
Best Anti-Friction.....dis 60
Duplex (Wood Track).....dis 60
Terry's Patent.....dis 60
Cronk's Patent, No. 4, \$18; No. 5, \$14.40; No. 6, \$18.....dis 50
Wood Track Iron Glad.....dis 60
Carrier Steel Anti-Friction.....dis 60
Architect.....dis 60
Rollips.....dis 60
Richard.....dis 60
Lane's Steel Anti-Friction.....dis 60
The Ball Bearing Door Hanger.....dis 60
Warner's Patent.....dis 60
Stearns' Anti-Friction.....dis 60
Stearns' Challenge.....dis 60
Fairless.....dis 60
Rider & Wooster, No. 1, \$24; No. 2, \$7.50.....dis 60
Paragon, Nos. 1, 2 and 3.....dis 60
Paragon, Nos. 5, 6, 7 and 8.....dis 60
Crescent.....dis 60
Nickel Cast Iron.....dis 60
Harris, Macleod and Steel.....dis 60
Scranton Anti Friction Singe Strap.....dis 60
Seron on Anti-Friction Double Strap.....dis 60
Universal Anti Friction.....dis 60
Wild West, 4 in. wheel, \$15; 5 in. wheel, \$21.....dis 60
Star.....dis 60
May.....dis 60
Hatchets—List Jan. 1, 1890.
Isaiah Blood.....dis 35
Hunt's Shingling Lath and Claw.....dis 35
Hunt's Broad.....dis 35
Buffalo Hammer Co.....dis 35
Payette R. Plumb.....dis 35
Wm. Mann, Jr., & Co.....dis 35
Underhill's Edge Tool Co.....dis 35
Underhill's Haines and Bright goods.....dis 35
G. Hammond & Son.....dis 35
Simmons.....dis 35
Kelly's.....dis 35
Sargent & Co.....dis 35
Ten Ryck Edge Tool Co.....dis 35
Collins following list.....dis 35
Shingling, Nos. 1, 2, 3.....dis 35
Lansing, Nos. 1, 2, 3.....dis 35
Blay Knives.....dis 35
Lightning—Mfrs. price \$18, dis 25
Jobber's Extras.....dis 25
Electric.....dis 25
Gem.....dis 25
Lawson's.....dis 25
Cartor's Needle.....dis 25
Heath's.....dis 25
Hinges.
Wrought Iron Hinges—
Strap and T.....dis 70
Screw Hook and Eye.....dis 70
Heavy Welded Hook.....dis 70
Roll Blind Hinges.....dis 70
Rolled Blind Hinges, Nos. 32 and 34.....dis 70
Rolled Plate.....dis 70
Rolled Raised.....dis 70
Plate Hinges, 5, 10 & 12 in.....dis 70
"Providence" over 12 in.....dis 70
Saw Hinges.
Geat's Springs and Blank Butts.....dis 40
Union Spring Hinge Co.'s list, March, 1886.....dis 40
Acme and U S.....dis 40
Empire and Crown.....dis 40
Hero and Mo arch.....dis 40
American, Gem, and Star, Japaned.....dis 40
Oxford, Bronze and Brass.....dis 40
Barker's Double Acting.....dis 40
Union Mfg. Co.....dis 40
Bommer's.....dis 40
Buckman's.....dis 40
Chicago.....dis 40
Steel Hinges.
Western.....dis 40
N. E.....dis 40
N. K. Reversible.....dis 40
Clark's, Nos. 1, 2, 3.....dis 40
N. Y. State.....dis 40
Common Sense.....dis 40
Seymour's.....dis 40
Shepard's.....dis 40
Reed's Latch and Hinges.....dis 40
Bind Hinges.
Parker.....dis 75
Beymour.....dis 75
Nicholson.....dis 75
Huffer.....dis 75
Clark's, Nos. 1, 2, 3, 4 and 50.....dis 75
Clark's Mortise Graving.....dis 75
Sargent's, Nos. 1, 2, 3, 4, 11, 13.....dis 75
Bedding's Noiseless.....dis 75
Shepard's Noiseless Niagara Buffalo (Hand Made).....dis 75
Steamboat, Clark's Old Pattern and Clark's Tip Pattern.....dis 75
Shepard's O. S. Lull & Porter.....dis 75
Shepard's Acme, Lull & Porter.....dis 75
Clark's Lull & Porter, Nos. 9, 1, 14.....dis 75
North's Automatic Blind Fixture, No. 2, for Wood, \$10.50; No. 3, for Brick, \$13.50.....dis 75
Knees.
Garden, Mortar, &c.....dis 60
Planter's Cotton, &c.....dis 60
Warren Hoe.....dis 60
Magie.....dis 60
D. & H. Scovill.....dis 20
Lane's Crescent Planter Pattern.....dis 40
Lane's Razor Blade, Scovill Pattern.....dis 40
Maynard, S. & O. Pat.....dis 40
Sandusky Tool Co., ".....dis 60
Hubbard & Co., ".....dis 60
Bare ".....dis 60
Hess King's and Kings.....dis 60
Hill's Improved Ringers.....dis 40
Hill's Old Style Ringers.....dis 40
Hill's Tongue.....dis 40
Hill's Rings.....dis 40
Perfect Ringers.....dis 40
Blair's Box Ringers.....dis 40
Blair's Box Ringers.....dis 40
Champion Ringers.....dis 40
Champion Rings, Double.....dis 40
Brown's Ringers.....dis 40
Brown's Ringers.....dis 40
Relating Apparatus.
Moore's Hand Hoist, with Lock Brake.....dis 70
Moore's Differential Pulley Block.....dis 70
Helders, File and Tool.
Rain.....dis 70
Nicholson File Holders.....dis 70
Hollow Ware.
Stove Hollow Ware Ground.....dis 60
Stove Hollow Ware Unground.....dis 70
Kneaded and Tinned Hollow Ware.....dis 70
Oval Boilers, Saucepans & Gine Pots.....dis 70
Gray Enamel Ware.....dis 40
Azule and Granite Ware.....dis 40
Rustless Hollow Ware.....dis 50
Galvanized Tea-Kettles—
Each.....dis 60
Silver Plated—4 mo. or 5 cash in 30 days.....dis 60
Reed & Barton.....dis 60
Meriden Britannia Co.....dis 60
Simpson, Hall, Miller & Co.....dis 60
Rogers & Brother.....dis 60
Hart or Silver Plate Co.....dis 60
William Rogers Mfg. Co.....dis 60
Cut Iron.
Bird Cage, Sargent's list.....dis 60
Bird Cage, Reading.....dis 60
Clothes Line, Sargent's list.....dis 60
Clothes Line, Reading list.....dis 60
Ceiling, Sargent's list.....dis 60
Harris, Reading list.....dis 60
Coat and Hat, Sargent's list.....dis 60
Coat and Hat, Reading.....dis 60
Wrought Iron.
Cotton.....dis 30
Cotton Pat. (N. Y. Mallet & Handle Wks.).....dis 30
Fassel and Picture (T. & S. Mfg. Co.).....dis 50
Wrought Staples, Hooks, &c.....See Wrought Goods
Bench Hooks.....See Bench Stops
Wire.
Wire Coat and Hat, Gem, list April, 1886.....dis 45
Wire Coat and Hat Miles, list April, 1886.....dis 45
Indestructible Coat and Hat.....dis 45
Wire Coat and Hat, Standard.....dis 45
Welt.....dis 75
Grass.....dis 80
Whitcomb-Patent.....dis 60
Hooks and Eyes—Malleable Iron.....dis 70
Hooks and Eyes—Brass.....dis 60
Fish Hooks, American.....dis 60
Horse Nails.
Nos. 6, 7, 8, 9, 10
Ausable.....dis 25
Easton.....dis 25
Lyra.....dis 25
Snowden.....dis 25
Putnam.....dis 25
Vulcan.....dis 25
Northwest.....dis 25
George.....dis 25
C. C.....dis 25
C. B. K.....dis 25
Champaign.....dis 25
New Haven.....dis 25
Saracno.....dis 25
Champion.....dis 25
Taylorwell.....dis 25
Star.....dis 25
Anchor.....dis 25
Western.....dis 25
Empire Bronzed.....dis 25
Horse Shoes.—See Shoes, Horse.
Hose, Rubber, competition, 75-10 to 75-10 1/2
Standard.....dis 70
Extra.....dis 60
N. Y. B. & P. Co., Para.....dis 60
N. Y. B. & P. Co., Extra.....dis 60
N. Y. B. & P. Co., Dundee.....dis 60
Huskies.
Blair's Adjustable.....dis 70
Blair's Adjustable Clipper.....dis 70
Joe Picks, Chisels, &c.
Am. Ice Chisel, old.....dis 30
National Ice Chisel.....dis 30
Novy's Ice Breakers.....dis 30
Dunlap's Ring Picks.....dis 30
Wood Head Picks Sargent's.....dis 30
Iron Head Picks, Sargent's.....dis 30
Ice Mallets, Pick in handle.....dis 30
Hockey Stick, Cut or Mail.....dis 30
Combination Ice Tools.....dis 30
Acme Ice Pick and Tongs.....dis 30
Roger's Lightning Ice Chisel.....dis 30
Ice Tongs.
Champion, S. S. & Co.....dis 40
Family.....dis 40
Jack Screws.—See Screws.
Kettles.
Large 7 to 17 in.....dis 20
Brass larger than 17 inches.....dis 20
Enamelled and Tea Kettles.....dis 20
Keys.
Lock Ass't list Dec. 30, 1886.....dis 50
Eagle, Cabinet, Trunk and Padlock.....dis 30
Hotchkiss' Brass Blanks.....dis 40
Hotchkiss' Brass Blanks.....dis 40
Hotchkiss' Padlock and Cabinet.....dis 40
Ratchet Red Keys.....dis 40
Knife Sharpeners.
Parkin's Applewood Handles.....dis 50
Parkin's Rosewood or Cocobolo.....dis 50
Knives.
Wool Putcher Knives.....dis 20
Ames' Butcher Knives.....dis 20
Nichols' Butcher Knives.....dis 40
Ames' Shoe Knives.....dis 20
Ames' Bread Knives.....dis 15
Moran's Shoe and Bread Knives.....dis 20
Table and Pocket.....dis 20
Door Mineral.....dis 60
Door Por. Pap'd.....dis 70
Door Por. Nickel.....dis 20
Door Por. Plated, Nickel.....dis 20
Door Por. Plated, Nickel.....dis 20
Bemacite Door Knob, new list.....dis 10
Yale & Towne Wood Knobs, list Dec. 1885.....dis 10
Furniture Nail.....dis 10
Furniture, Wood Screws.....dis 10
Base, Rubber Tip.....dis 70
Picture, Sargent.....dis 70
Picture, Hemacite.....dis 70
Shutter, Porcelain.....dis 60
Carriage, Japanned.....dis 60
Ladies.
Melting, Sargent's.....dis 50
Melting, Reading.....dis 50
Melting, Monroe's Patent.....dis 50
Melting, P. S. & W.....dis 50
Melting, Warner's.....dis 50
Lawn Mowers.
Standard List.....dis 50
Enterprise.....dis 50
Lanterns.
Tubular, Lift Wire, with Guards.....dis 40
Tubular, Lift Wire, with Guards.....dis 40
Tubular, Square Plain, with Guards.....dis 40
Tubular, Sq Lift Wire, with Guards.....dis 40
Without Guards, 25¢ dozen less.
Police, Small, \$5.00; Med, \$7.25; Large, \$9.75.....dis 40
Lemon Squeezers.
Porcelain Lined, No. 1.....dis 30
Wood, No. 2.....dis 30
Wood, Common.....dis 30
Dunlap's Improved.....dis 30
Samson, No. 1, \$5; No. 2, \$3; No. 3, \$18.....dis 30
Jennings' "Big".....dis 30
The "Boss".....dis 30
Dean's.....dis 30
Little Giant.....dis 30
King.....dis 30
Lines.
Cotton and Linen Fish, Draper's.....dis 50
Draper's Chalk.....dis 50
Draper's Mason's Linen, 8 ft, No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25.....dis

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THE IRON AGE

THURSDAY, OCTOBER 18, 1888.

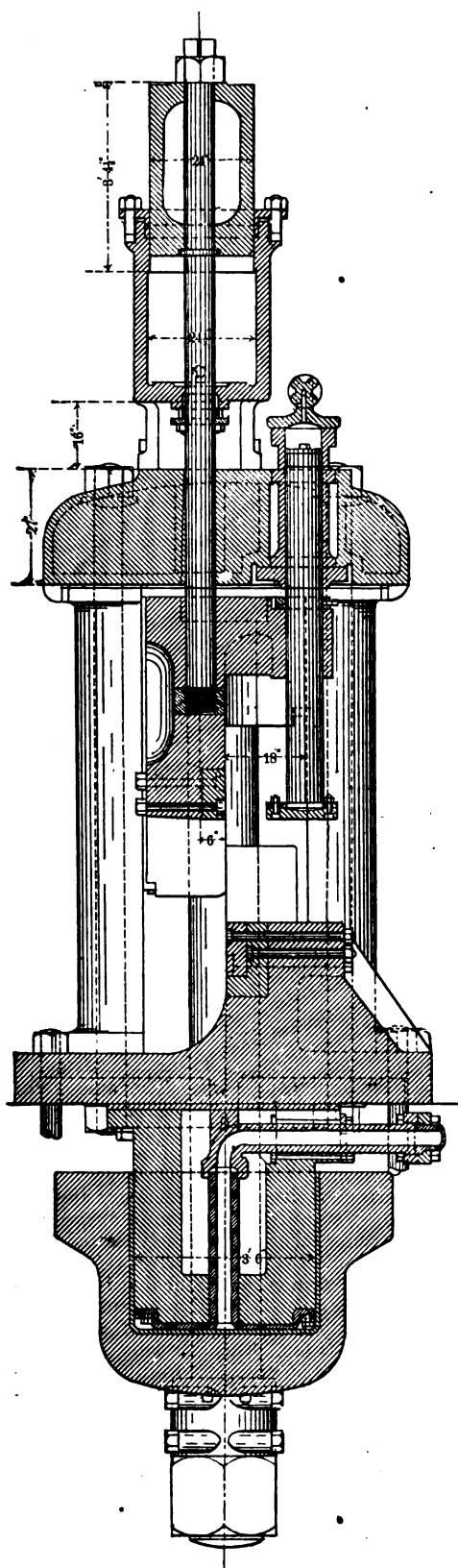


Fig. 1.—Section through A B, Fig. 2.

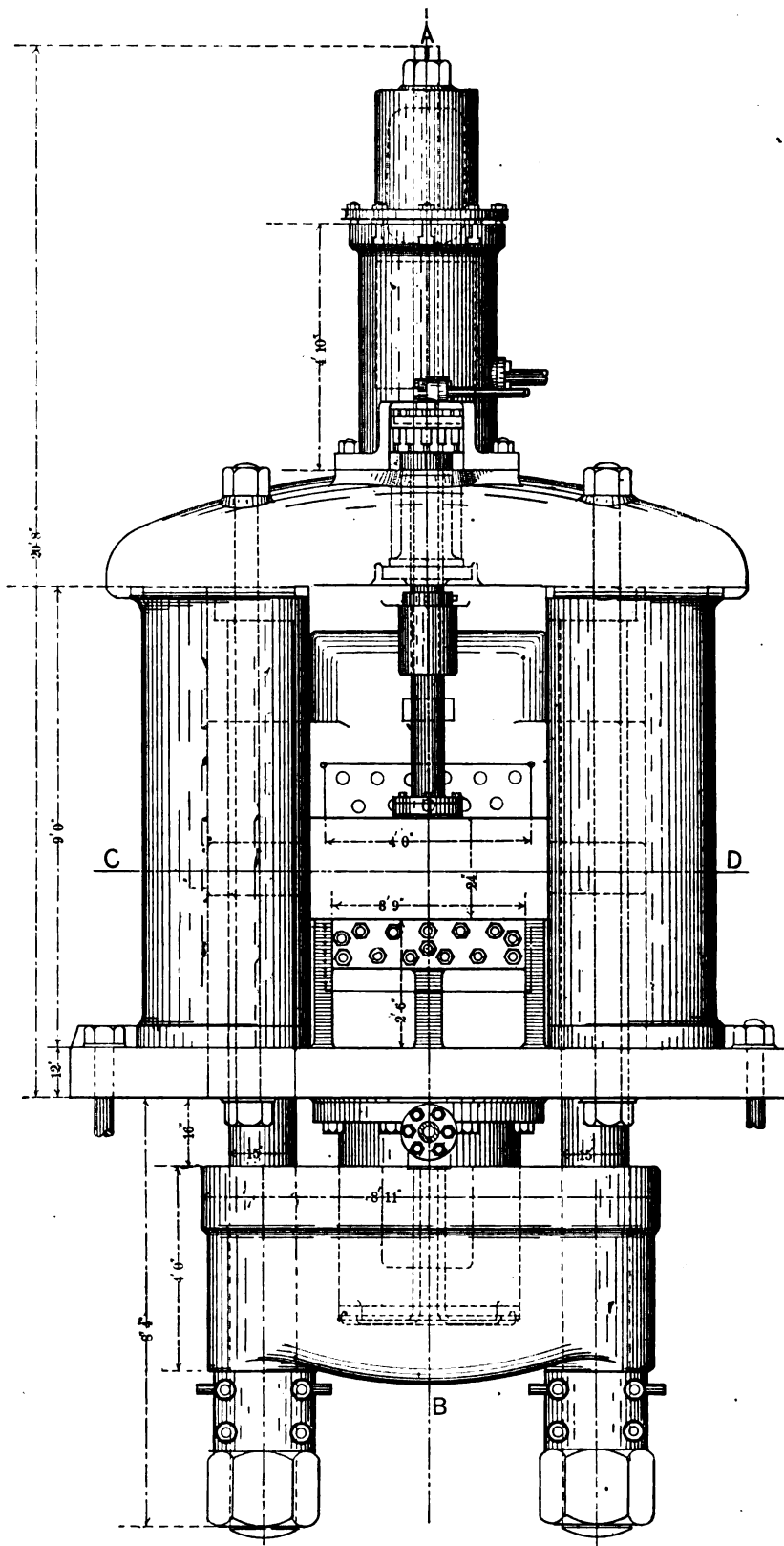


Fig. 2.—Front Elevation.

3000-TON SHEAR, HOMESTEAD STEEL WORKS, CARNEGIE, PHIPPS & CO.

A Three-Thousand Ton Shear.

The illustrations which we present herewith, while they show the construction, fail utterly to convey an adequate conception of the dimensions of what is undoubtedly the largest shear in the world. It has been

in successful use for some time past at the Homestead Steel Works of Carnegie, Phipps & Co., at Munhall, near Pittsburgh, Pa. It is rated at 3000 tons, and is a part of the famous slabbing mill. Briefly stated, the shear is operated by the descent of the upper blade, which is ef-

fect by the introduction of water at a pressure of 4000 pounds per square inch, into the cylinder shown in the lower part of our engraving. The plunger is stationary, the cylinder proper being forced downward. This motion is transferred to the casting, which carries the upper blade

by the two 15-inch bolts shown in the drawing. These two bolts, it may be stated, are forgings specially made by Whitworth for this shear. The cylinder, if it may so be called, is a very heavy steel casting, weighing, as it does, 54,600 pounds. It is 13 inches thick on the bottom and 17½ inches thick on the sides, and is 37 inches deep. Its width from center to center of the two 15-inch bolts is 6 feet 6 inches, and its total width 8 feet 11 inches. The cross piece carrying the upper blade was a particularly difficult steel casting to make. It will be observed that it is brought back into place by a special lifting cylinder placed on top of the shear. The small hydraulic cylinder shown back of the blade in Fig. 1, with its long plunger, is the gag to hold down the slab or billet to be sheared when it becomes so short that its weight is not great enough to prevent its tipping while the shear is operating. The shear has a capacity to cut steel 48 inches wide and 24 inches thick. The blades proper are made of crucible steel, double diamond in section. These knives are being used in all the shears at Homestead. The shear was built by the Morgan Engineering Company, of Alliance, Ohio. A study of the dimensions inscribed in our drawings will afford some idea of the magnitude. It is over 15 feet high over all, the top of the frame proper over 11 feet high.

Electric Welding.

In a paper on "Electric Welding," presented at the Scranton meeting of the American Society of Mechanical Engineers, this week, Mr. C. J. H. Woodbury explained that the process enables the welding of any two pieces of the same metal or alloy ranging from the most refractory metals to the alloy which fuses at 162° F. It will join dissimilar metals when the welding point of one is not too far in excess of the fusion point of the other.

These results seem to indicate that the classification of metals into welding and non-welding has been due to imperfections in the ordinary and time-honored methods, rather than any peculiarity in physical constitution warranting such arbitrary classification. The process is far cheaper than that of hand welding, and also extends to other methods of manufacture, but the comparative expense differs according to the previous conditions in every place where it has been applied thus far. Its applications in practical work thus far have been confined to butt-welding for many purposes, such as continuous wire work, carriage work, axles and tires, cotton bale ties, barrel hoops and wire cables and many miscellaneous purposes. Axes are made of drop forgings, joining the tool steel edge to a mild steel poll, bars are heated in the middle and upset, forming collars, and pipes are joined together—a matter of great value in ice machines. The list might be continued to greater length, but this indicates the range of its practical uses at this early day.

The value of the process, for most purposes, independent from any scientific interest or mechanical ingenuity shown in the apparatus, must be that of the resistance of the welds under tensile stress. It will be readily understood, however, that, as this process accomplishes many things hitherto impossible, aside from any question of ultimate strength, it is fitted for applications in many constructions where it saves labor and time; provided only that the joints be in all cases sufficiently good for the purpose for which the article is designed. A large field thus opens up in the execution of ornamental design in metal work, where it will supplant screws, rivets or solder for fastenings, and in other evident applications. We would add that

the machines by which the welding is accomplished were illustrated and described in *The Iron Age* of July 12, 1888.

Hot-Air Heating and Ventilating.

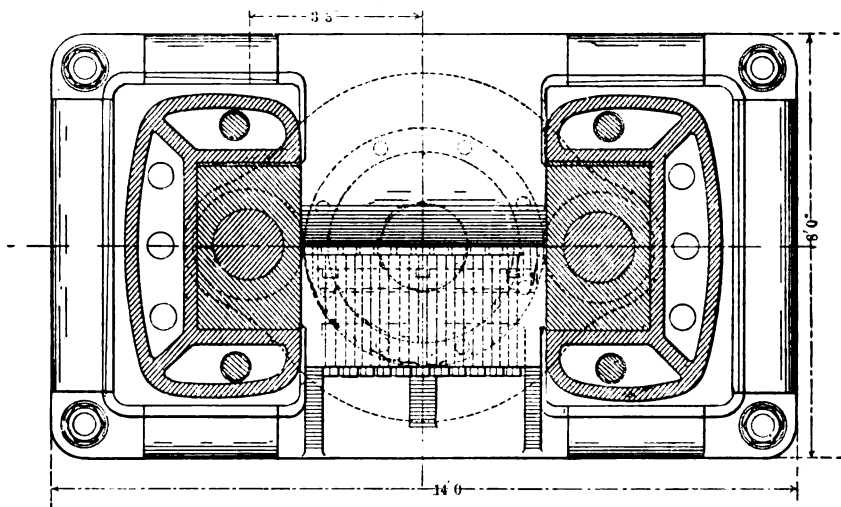
The system of hot-air heating and ventilating by means of a fan in connection with a steam heater, through which the air is forced wherever required, is now being rapidly introduced. In view of the interest attached to it we need offer no apology for again referring to the subject, illustrations of some of the details of the plant having appeared in *The Iron Age* for February 2, 1888. It possesses not only the special advantages of supplying an ample quantity of fresh air, but many others that make it preferable to steam-heating by direct radiation.

In this system a combination is made of the heating and ventilating arrangements, thereby reducing the running expenses which would be incurred by the two running independently. Simply stated, the method of application is as follows: Fresh air from out of doors is conducted to a specially constructed steam-heater, through

to one-fifth the pipe is required that is necessary in the system of direct radiation.

The entire heater is inclosed in a steel-plate jacket, which precludes all possibility of fire. The steam fan immediately joins the heater and is of a type specially designed for ventilating, being able to handle large volumes of air at a very small expenditure of power. Motive power for the fan is derived from a direct-connected upright engine, the exhaust from which is used in the heater. The cost of running the blower is thus reduced to practically nothing, for the heating power of exhaust steam is only about 3 per cent. less than that of live steam. The engine cylinder may, consequently, be considered as simply an enlargement in the steam-pipe on its way to the heater.

Instead of a large number of air-cocks and valves through the building there are in this apparatus only the few valves on the heater and engine to be attended to, and these are but a few feet apart. The entire apparatus occupies but little space, and that where it is generally of little value. Registers in the inlets into the separate rooms serve, at the discretion of their occupants, to preserve the proper



3000-Ton Shear.—Fig. 3.—Section through C D, Fig. 2.

which it is rapidly drawn by means of a fan which discharges from its mouth the air thus heated. By means of a properly arranged system of distributing ducts this air is delivered to the various rooms of the building. The air passages should if possible be built into the walls, but under other circumstances may be constructed of galvanized iron. The position of the outlets may be varied to suit local conditions. In manufacturing establishments where galvanized iron ducts are used, they are usually suspended from the ceiling and extended centrally the entire length of the room, and branches or outlets are taken out at desirable points. In order to save material and to preserve an equality of pressure, the main pipe is usually reduced in diameter proportionally to the branches taken out.

The apparatus in its most approved form is manufactured by B. F. Sturtevant, of Boston. The heater is made up of independent cast-iron sections, into which are screwed wrought-iron pipes which connect at the top and serve as a passage for steam from one end of the section to the other. A circulation of steam is kept up through these pipes and bases, the water of condensation being removed by means of a steam trap. It is claimed that a great reduction in the amount of pipe required to do a given amount of heating is made when the hot-blast steam-heating apparatus is used. The high velocity of the air crossing the pipes causes a very rapid condensation of the steam, and only one-third

atmospheric conditions. The amount of air and its temperature and humidity are directly under control.

In theaters and halls of audience this system finds its most complicated, but, nevertheless, its most satisfactory application. Naturally, in such buildings, where the occupants are very closely seated, the greatest need is felt for perfect ventilation, and no system is successful that is not positive, and none is positive except that dependent upon the propulsion of the air by means of a fan. Commercially speaking, however, as an accessory to different processes of manufacturing, it is the most valuable. In the various methods of drying such materials as lumber, wool, cloth, grain, tobacco, glue, &c., the effort has always been to secure a circulation of the heated air. Certainly nothing can be more reasonable than to make the circulation sure and positive by means of a fan.

A direct telephonic line has now been established between Paris and Marseilles. The charge for five minutes' conversation between the two cities has been fixed at about 60 cents. Conversations between Paris and Lyons will also be practicable by the new line, as well as between Lyons and Marseilles.

Iron ore from Catorce, in Mexico, will be shipped to the United States as soon as a branch of the Mexican National Railroad can be constructed.

English Engineering Supplies.

What is probably the most complete English catalogue that we have yet seen has just been sent us by Messrs. John Birch & Co., engineers and merchants, of Liverpool, England. It relates to railroads and rolling stock, giving the cost of plant and material for portable, light and main lines, and containing also chapters on river steamers and light craft and dredging plant. Those who have become familiar with the ordinary run of English trade catalogues will find the present one a decided departure from the general type, the care which has been given to its preparation putting it, so far as the giving of information is concerned, on a level with many of the elaborate and pretentious American specimens. It is a book measuring $8\frac{1}{2} \times 12$ inches, and embraces 232 pages, and is profusely illustrated, the engravings showing all the different forms of devices and machinery which the firm are prepared to supply to intending purchasers. One of the principal features of the catalogue which will strike the examiner at once is the complete system of code words which has been adopted, and by which not only each article, be it either a railway car or a locomotive has its word for reference and cable, but every probable modification and extra which would be required in connection with it is also coded. We need not, therefore, specially point out that the book would be of great benefit particularly to the buyer or engineer in distant countries, for whom apparently it has been specially designed, and who without such a book would probably be obliged to correspond for many weeks with agents in manufacturing centers. As intimated, the book treats of both portable railways and main line works, the former being taken up first. Then come descriptions of cars and rolling stock generally, followed by particulars and engravings of locomotives, turn-tables, water tanks and columns, dredges, &c. Concluding chapters are given on light railways, steam launches and dredging plants, these latter often being useful in connection with railway systems and contractors' work. A carefully prepared index also is given, which adds very much to convenience in looking up any particular piece of machinery. A number of blank sheets make up the final portion of the catalogue, and are intended for the convenience of inserting supplementary pages which may be issued from time to time.

A New Torpedo.—For some time past experiments with a new form of torpedo have been conducted at College Point, L. I., by the Naval Board of Ordnance. The torpedo is the work of Messrs. George A. Haight and William H. Wood, and is of the well-known cigar design. It is propelled by carbonic acid gas and is controlled by electricity. It is about 40 feet long and 24 inches in diameter, and is supported under water by a second cigar-shaped float of somewhat greater length. Tests which were recently made with the Navy Yard tug Nina seem to have given very satisfactory results. The Nina was used as a target, being anchored behind a torpedo net about $\frac{1}{4}$ mile from the point of discharge. For the trial the netting was not of very strong make, and the explosive charge consisted of only a small can of powder. The distance was traversed in a little less than three minutes, the torpedo cutting clean through the netting, showing that under practical working conditions it would have brought about disastrous results to the target.

It is of some interest to note that the French Minister of War has published his *Instructions sur l'armement de l'infanterie*

an illustrated description of the much-talked-of Lebel rifle, of which 350,000 are now being issued to the French army. The construction of the rifle has for some time been a jealously guarded secret, and the publication accordingly is denounced by many French journals as a serious mistake.

The Rapid City School of Mines.

A representative of *The Iron Age* had occasion lately to visit the School of Mines, at Rapid City, Dak., and was much surprised to find such a noble beginning made for a technical school in that distant locality. There are two buildings, both built of brick, located far enough apart to make wings for a main building which is intended to be located between them, according to the original design. One building contains the Dean's office, a well-equipped laboratory and a furnace-room on the ground floor, a large lecture-room and classrooms on the second floor, and a very large cabinet of mineralogical specimens on the third floor. The other building is not completely finished, needing a little more work on some of the rooms, but it contains several rooms to be used for laboratories, and one large room on the ground floor which is now supplied with a complete plant for milling and concentrating ores. A 40 horse-power steam engine furnishes the power to crushers, stamps, cornish rolls, jigs, vanners, &c. Mill runs are made of gold, silver and tin ores, &c., which are brought here to be tested from various parts of the Black Hills. The school having been erected by the Territory of Dakota, and, being supported from the public funds, its facilities are open to the public, who are asked merely to pay the cost of the tests which they wish to have made. All experiments in the use of machinery or in milling and concentrating ores of diverse characteristics are open to all who choose to apply for the results. A furnace for smelting tin concentrates has been partly completed and will be finished as soon as next year's appropriation becomes available. F. R. Carpenter is Dean of the school, and among the faculty is Prof. H. O. Hofman, late of the Institute of Technology, Boston. This institution is hardly three years old as yet, but it is exerting a marked influence in directing the intelligent development of the wonderful mineral resources of the Black Hills. The plan upon which it is based is regarded as so eminently adapted to its purpose that it has been taken as a model by one or more of the Australian colonies in organizing a similar school. Over 40 students received instruction within its walls last year, which number will probably be increased this winter. A peculiar feature of the school is the number of practical miners who avail themselves during the winter of the opportunity presented to them for acquiring a thorough knowledge of mineralogy. The situation of the school is highly advantageous by reason of its proximity to gold, silver, lead, zinc, tin, iron, coal and other mines, which are all within a few hours' ride, so that the student can with little loss of time from his studies observe the practical details of mining almost all the minerals in ordinary use and some which are quite rare.

A correspondent of the London *Economist* reports that an English syndicate has just bought a large concern in Hagen, Westphalia, whose specialty is the manufacture of iron and tools, and is about to make a joint-stock concern out of the same. According to a perhaps prejudiced statement, it would look as if it was intended to evade the British Merchandise act by providing the goods manufactured in Hagen with the stamp of a British firm.

The Growth of West Superior.

The growth of West Superior, among the rising cities of the Northwest, is unique. Within three years its real estate valuation has risen from \$500,000 to hardly less than \$10,000,000. In 1885 the first transfers of lands, and which now forms the site of West Superior, were made to the Land and River Improvement Company, of New Jersey, a corporation organized for the special purpose of building a city at the head of Lake Superior. Its stockholders and directors were New York capitalists, merchants and lawyers and Northwestern railroad men. Their entire purchase included a trifle over 4000 acres, constituting the apex of a peninsula formed by St. Louis River and Bay and Superior Bay, including a shore line front of over ten miles, and bearing about the same relationship to the great harbor at the head of Lake Superior that Manhattan Island does New York Harbor. The original Bay of Superior (now divided into Duluth Harbor, Superior Bay and Allouez Bay), is a magnificent stretch of water, 7 miles in length and $1\frac{1}{2}$ in breadth, perfectly guarded from lake tempests by two narrow strips of land, which reach out across the head of the lake from both the Minnesota and the Wisconsin shores. West Superior, connected with five of the great railway systems of the Northwest, claims special advantage as a point of shipment between Nebraska, Colorado and Dakota to other points on Lakes Erie, Huron and Ontario, and has full confidence in her commercial future. Besides extensive mercantile docks, one of them 2900 feet in length, elevators of 8,300,000 bushels capacity and large steamship, grain and coal interests, West Superior has in course of establishment a large steel works and furnace plant under the auspices of the Land and River Improvement Company.

Last July the work of construction on the foundry building, 356 x 85 feet, was commenced, and the various auxiliary buildings let to contract. The plans as drawn contemplated a plant covering 200 acres of land. Dredging for a large coal dock has been going on ever since, and the walls of the foundry building are almost up. A very large furnace plant was included in the plans, and it was expected that one 200-ton furnace would have been erected this fall, but there is unexpected delay. It is in contemplation, however, to expend fully \$500,000 next year, with the result of bringing into existence one of the largest manufacturing plants in the West.

New Armington & Sims Engines.

The Armington & Sims Engine Company, of Providence, R. I., have recently brought out several new designs of engines, which, in many respects, are interesting, and of which we have been supplied with photographs. One of these shows a plant recently furnished for the United States cruiser Boston, for electric lighting, the engine being of the double-cylinder, double-acting design, to which we had occasion to refer some months ago. The valves for both cylinders are controlled by the well-known Armington & Sims automatic governor. The engine itself is very compact and can be run at high speed. It is connected to the dynamo by gearing. A plant of the same general type, but to couple direct to the dynamo with a flexible coupling, is at present being built for the cruiser Baltimore. The second photograph shows a compound condensing engine of 100 horse-power, being one of five built for the machine shops of the Ordnance Department, at the Washington Navy Yard. The cylinders are placed side by side, with the cranks opposite. The engines are perfectly balanced, can be run at a high speed and are particularly

well adapted for electric lighting. Compactness in both designs is a very noticeable feature, and will no doubt do much to commend the engines favorably.

Captain Jones's Reply.

Captain William R. Jones, general manager of the Edgar Thomson and Homestead Steel Works, has sent a letter to the *Ironmonger*, in which he replies to the curious comments made by our contemporary on American steel practice, taking Captain Jones's remarks at the meeting of the Iron and Steel Institute as a text. We printed both the report and the editorial comment, and may now close the incident, as the French politicians put it, by quoting the following:

The remarks I made at the Edinburgh meeting were prompted by a remark made by Mr. Clark—viz., that punching the steel was a good way to test it; and he was followed by Mr. Cooper, who stated that from conversation with American engineers he was surprised at their lack of confidence in steel as a material for bridge construction. The story I told of seeing a heat made in eight minutes I will tell again, and more fully. Visiting a steelworks making at the time of my visit soft steel, I saw them blow the heat in eight minutes; as soon as the vessel was turned down the ferromanganese (which had been drawn from a heating furnace, but at the time of being put in the ladle was cold) was added. The metal was at once poured into the mold, and I believe the reaction is still going on in that steel. I might add to this by saying that the gifted genius who made steel as described above was so uniformly successful in making bad steel that he involuntarily retired from the business; but in the meantime he had done a great deal to lead engineers to believe that Bessemer steel was not a reliable material. The average daily output of the leading Bessemer works in America will range from 900 to 1100 tons, and the work is done easily and readily, and done thoroughly well; and in my judgment no better steel is made anywhere, either Bessemer or open-hearth, than is made in America. After reviewing the principal Bessemer works on this side, I am compelled to believe that the American steel makers have good reason to be proud of their success, and we certainly are the equals of any in producing good, reliable steel.

A New Roller Bearing.—Mr. R. W. Hent, of San Francisco, Cal., has invented an improved roller bearing of the class bearing directly on both the shaft and casing, and a series of separating rollers of smaller diameter bearing neither on the shaft nor casing, but on the bearing rollers, to keep the latter separate from each other, and in which the separating rollers are kept from contact with the shaft by their bearing on the bearing rollers and from contact with the casing by their bearing on an encircling ring. This ring having only the separating rollers for its bearings, its axis is liable to shift from the axis of the shaft, and the object of Mr. Hent's invention is to limit this shifting by interposing the ring between journals of the bearing rollers on its periphery and journals of the separating rollers on its inner side, the two series of rollers being so arranged relatively to each other and their journals made the proper dimensions to insure rolling and prevent rubbing contact. This ring bears at its periphery on journals of the bearing rollers as well as at its inner side on journals of the separating rollers. It is claimed that this roller bearing is specially adapted for journals in which there is little wear, such as window pulleys and sliding door rollers. It is controlled by the San Francisco Roller Bearings Company.

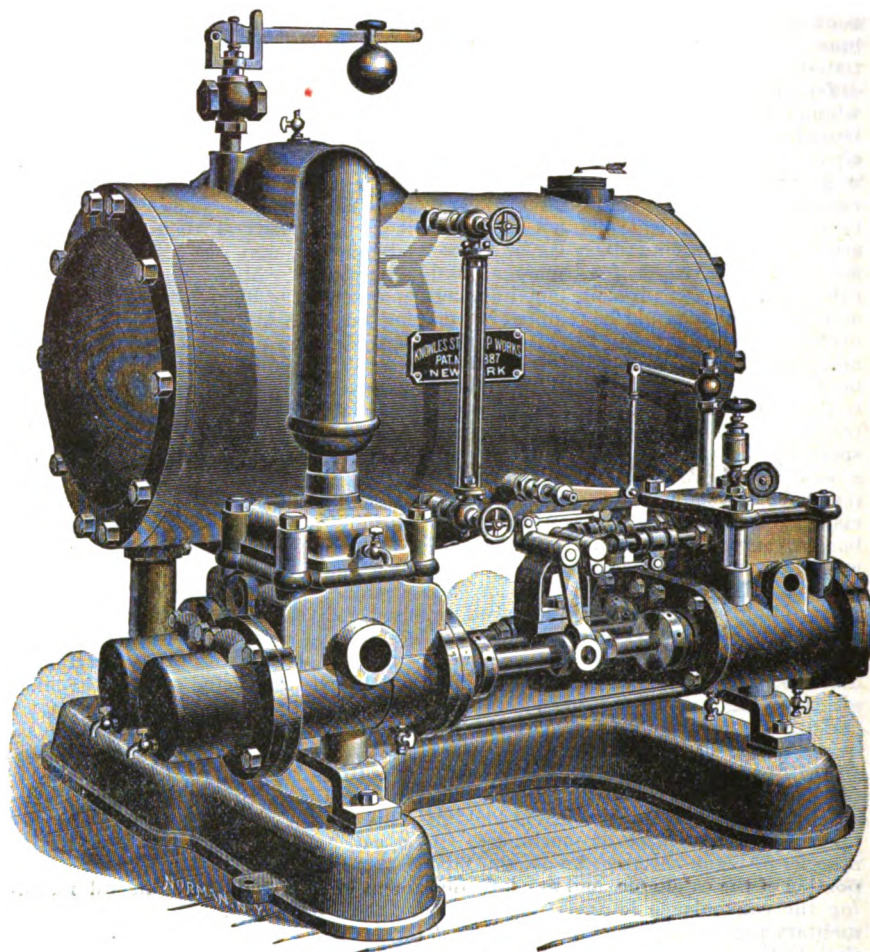
The Swinerton locomotive, with polygonal drivers, first brought to notice about a year ago, has again appeared on the surface. A number of improvements are said to have been made in her machinery, and the engine is now reported running on the Boston and Maine Railroad.

Automatic Feed Pump and Receiver.

We present on this page an engraving of a new design of feed pump with receiver just brought out by the Knowles Steam Pump Works, of Boston and New York. The combination is specially intended for draining coils, radiators, heaters, drying cylinders, steam jackets, &c., and feeding the water of condensation in its hottest condition direct to the steam boilers. It is reliable and entirely automatic in its operation. It does away with the expense and annoyance of traps and tanks and returns the condensed steam to the boiler in a steady, continuous flow as fast as it accumulates in the receiver above the pump. It is not affected by the varia-

pump stops entirely. The hollow copper float cannot fill with water by "sweating" or by actual leakage, as it is drained from the bottom through the hollow arm and axis. The interior of the float is in communication with the outside atmosphere. It will be noticed that in this new design the receiver is placed alongside the pump instead of overhead as in the older form. The latter, however, is also being turned out. The outfit is made in three sizes with capacities ranging from 9 to 58 gallons per minute.

In a book on surveying, published in Germany, by Jacob Koebel, about 340 years ago, the author gives the following instruction, accompanied by a wood cut, as



IMPROVED AUTOMATIC PUMP AND RECEIVER, BUILT BY THE KNOWLES STEAM PUMP WORKS, NEW YORK.

tion of steam pressure, and is claimed to entirely prevent all snapping and "water-hammer" in pipes, so often caused by the use of traps having intermittent action. The pump and receiver can, of course, be used for other purposes than those just mentioned, as, for example, the regulation of brine circulation in refrigerating machinery and circulating purposes generally.

The operation of the outfit will, no doubt, be readily understood. The condensed steam or other liquid enters by the inlet nozzles at the top, shown at the right, and gravitates to the bottom of the receiver. As soon as it rises to a certain level it raises a float, which through lever connections, shown in the engravings, starts the pump. The latter takes off the water and forces it into the boiler. The speed of the pump is regulated through the float, and depends upon the quantity of water flowing in—the larger the quantity of water, the faster the pump moves. The pump slows down as the supply of water drops off, and when it ceases the

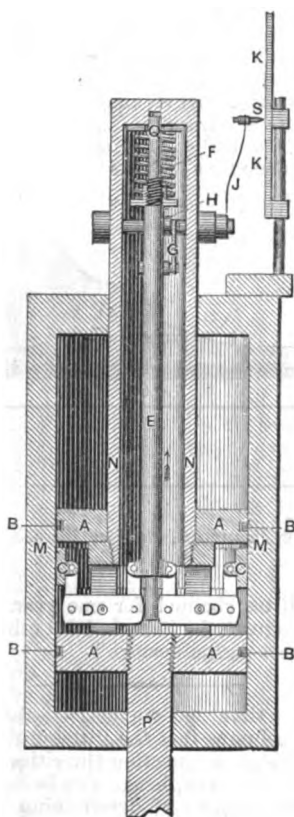
to how the length of a foot is to be found: "To find the length of a rood in the right and lawful way, and according to scientific usage, you shall do as follows: Stand at the door of a church on a Sunday and bid 16 men to stop, tall ones and small ones, as they happen to pass out when the service is finished; then make them put their left feet one behind the other, and the length thus obtained shall be a right and lawful rood to measure and survey the land with, and the sixteenth part of it shall be a right and lawful foot."

Twenty-seven boys on the nautical schoolship St. Mary's graduated at the annual examination last week. Since the school was established, in 1873, 477 boys have graduated, and fully 72 per cent. are now at sea. After dinner the boys gave an exhibition of seamanship aloft, after which the boys were mustered on deck and Captain Crowninshield addressed them. Shipowners and others were appealed to by Captain Samuels to provide places for graduates on American ships.

Friction of Piston-Packing Rings.

At the Scranton meeting of the American Society of Mechanical Engineers this week Mr. J. E. Denton gave an account of some measurements of the friction of piston-packing rings in steam cylinders with a device consisting essentially of the following arrangement:

A cylinder, M, 6 inches bore by 9 inches stroke is fitted with a piston, A, long enough to permit a packing ring, C, 1 inch wide to occupy the position shown. The ordinary packing rings B B prevent the access of steam into the space immediately surrounding C. The latter is supported upon the outer ends of the levers D D, which are pivoted at O, and have their inner ends coupled to the rod E. Motion is given to the piston A and its attachments through the piston-rod P. Motion being in the direction of the arrow, the friction of the ring C tilts the levers D, thus compressing the spring F. The resulting movement of the rod E, relative to the incasing tube N gives motion to a pencil lever, J, through the pitman G and the crank H. Consequently



Apparatus for Measuring Friction of Piston Packing Rings.

the motion of the pencil S perpendicular to the plane of the paper is proportional to the amount of friction of the ring C.

The pencil makes a diagram resembling a rectangle upon paper fastened to a board, K K. The ring C is cut once and is provided with a device, by the means of which its tension may be adjusted by a spring. Means are also provided whereby the ring may be drawn together so as not to touch the sides of the cylinder. When in the latter condition the spring F is calibrated by loading the rod E at Q with known weights and noting the resulting movement of the pencil S. The spring actually resisting the motion of the levers D is the torsion of the pivots O. The spring F is merely shown as an illustration of spring action.

Fac similes of diagrams obtained were presented. The horizontal distances on each side of a center or zero line represent

* This space is kept drained of condensed steam.

the friction on an up or a down stroke of the piston, the scale employed in the cases presented having been 250 pounds per inch.

The Coke Trade.

The one serious drawback to the coke industry at the present time is the shortage of cars, and the outlook for better shipping facilities in the near future is not encouraging. It is believed that if the car supply were equal to the demand the shipments of coke from the Connellsville region would be larger than at any time in its history. This statement is based on the present demand, which is greatly in excess of shipments, owing to the shortage of cars. For the months of August and September the output has steadily increased, until last week it aggregated 116,095 tons, which is an increase over the previous week of 550 tons. This increase is accounted for in part by the firing up of 100 ovens at the plant of the Connellsville Coke and Iron Company at Leisenring. The output for the month of September aggregated 438,307 tons, an increase of 45,035 tons over August, when the output was 393,272 tons. The shipments for the week closing on Saturday, the 8th inst., amounted to 5648 cars, distributed as follows: West of Pittsburgh, 3348 cars; Pittsburgh and rivers, 1100 cars; east of Pittsburgh, 1200 cars. These figures show a falling off of 695 cars over the previous week. The falling off was general, the Western shipments alone having decreased 425 cars, Pittsburgh shipments 100 cars, and Eastern shipments 170 cars. The shipments for September reached a grand total of 25,326 cars, distributed as follows: West of Pittsburgh, 13,916; Pittsburgh and rivers, 5270; East, 6140. This is an increase of 876 cars over August shipments. The September shipments averaged 1012 cars per day, as against 906 during August. The active ovens in the region now number 11,339, leaving but 1721 idle. One month ago there were 10,108 active and 2975 idle ovens. Prices remain at \$1 per ton, although some sales have been made and are still being made at \$1.15 and \$1.25 per ton. It is not expected that there will be any advance in the price for some time yet. The continued heavy shipments of outside coke to the various centers of supply, together with the disadvantages of the car shortage, will prevent the prices from advancing. No further attempts have been made looking to the formation of a coke syndicate, and all efforts to form one have been abandoned for the present, at least.

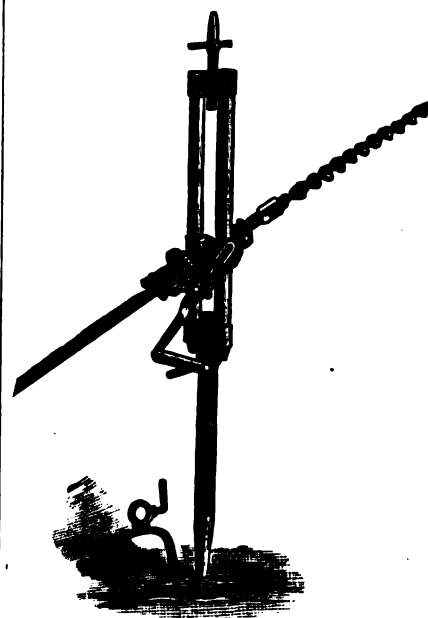
In the line of high chimneys, some interest is attached to the stack which has just been completed for the Clark Thread Company, at Newark, N. J. It is the highest chimney in the United States, and, for that matter, probably in the world. Three higher stacks are cited as existing in Scotland, but they were built for carrying off noxious fumes from chemical works, and not for creating a draft for steam-boiler furnaces. These chimneys are Townsend's, at Port Dundas, Glasgow, which is 454 feet high; Saint Rollox, at Glasgow, 436½ feet high, and Dobson & Barlow's, at Bolton, 367 feet high. The Clark chimney is 385 feet high, and supplies draft for 22 boilers, having an aggregate capacity of 4000 horse-power. The cost of the chimney is said to have been \$35,000.

It is much to be regretted that the question of a uniform coupling for continuous steam heating has not been decided ere this. The want of uniformity will do much to retard the settlement of a question that in other respects is progressing in a very satisfactory manner.

D

New Coal-Drilling Machine.

The Western Machine Works, of Ottumwa, Iowa, are bringing out the improved coal-drilling machine which we illustrate on this page. The cut will enable any one to understand, almost at a glance, its arrangement when in working position, making a description practically unnecessary. The machine is light and easily adjusted. By attaching the boot (which accompanies each machine) to the post extension a coal grip is available, which is securely fastened in the face of



New Coal-Drilling Machine.

the coal with the accompanying taper wedge, on which the side or direct motion will operate the same as on the post. This enables the miner to use the machine in any depth coal.

The Cost of Making Car Wheels.—E. Warne, of Easton, Pa., has printed figures, obtained from the Taylor Iron Works, at High Bridge, N. J., on the cost of making car wheels. It is based on the use of three-quarters of charcoal pig at \$26.50 per ton and one-quarter old wheels, at \$19 per ton, equal to \$24.62 per ton for the stock, four wheels being made from one ton:

Iron.....	\$6.16
Melting, core drying.....	.20
Sand, molds and cores, flour and facing..	.15
Foundry labor of molding and casting....	.85
Outside work, unloading materials.....	.10
Repairs, wear and tear, taxes, insurance, motive power and delivery charges...	.40
Cost.....	\$7.86

With wheels selling at \$8 apiece, this would leave a profit of 14 cents per wheel.

It is of some interest to note that a class in the theory and practice of steam engineering will be formed next month by the Young Men's Christian Association, of New York. The class will commence on November 14, and will meet Wednesday and Friday evenings from 8 until 10 o'clock, the term closing on April 29, 1889. The purpose of the class is to give instruction in those subjects which must be mastered to enable one to pass an examination for an engineer's license before the New York Police Department. Only iron-works employees or those who are working in machine shops or fire and engine rooms will be admitted as pupils. The services of Mr. William H. Weightman as instructor have been secured.

Moisture in Iron Ore.

Several iron importers have been engaged in a legal contest with the United States Government respecting the payment of duties on moisture in iron ore, or only on the ore itself. At Philadelphia, on the 12th inst., Judges McKennan and Butler, of the United States Circuit Court, took up the suits by John W. S. Earnshaw, an importer of that city, and by Sebastian B. Schlessinger, Clark L. Lehman, J. Mitchell Clark and Ludwig Dreier, of the iron house of Naylor & Co., of Boston and Philadelphia, against John Cadwalader, collector of customs. Mr. Earnshaw brings his suit to recover an alleged excess of custom duties amounting to \$71.61 on three importations of iron ore. Naylor & Co. claim \$371.61. The bill of complaint alleges that in importing say 1000 tons of ore, the article will contain at least 10 per cent. of moisture, and if the ore is placed in open air where the sun can strike it there will be a shrinkage from 1000 tons to about 900 tons. It is urged that the 75 cents per ton duty can be collected only on the real importation and not on the moisture.

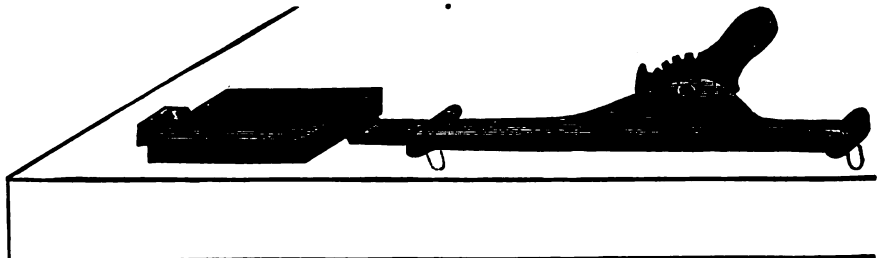
Mr. Isaac Fegeley, president of the Warwick Iron Company, of Pottstown, was one of several witnesses called by the plaintiffs, who testified that iron ore is bought and sold on a basis of being dried at 212°. William W. Thurston, president of the Bethlehem Iron Works, and who employs 3000 men, testified that he had purchased iron ore since 1883, and dealers always, with one exception, treated the water, which was mechanically and not chemically, combined with the ore, as distinct, and not a part of the ore, and trade was done on a basis of its being heated to 212°. At the close of the plaintiff's case, Assistant District Attorney Carr made a motion for a non-suit, on the ground that the meaning of the term iron ore had been determined by the Supreme Court as ore in the crude or natural state, and it is a question of law for the court to pass upon, and is without the province of a jury. The motion was overruled. The defense was then opened by Mr. Carr, who tried to show that the commercial designation of iron ore is ore in its natural or crude state. William D. Rees, of Cleveland, Ohio, who is in a company who produce 225,000 tons yearly, testified to the same fact. Other witnesses for the defense were Joseph D. Weeks, David F. Houston, president of the Crozer Steel and Iron Works, R. F. Smith, James Pickands and Thomas Wilson.

Powell Stackhouse, vice-president of the Cambria Iron Company, said that the person had to take his chance as to the amount of moisture contained in the ores. In recent years, 1881 and 1882, allowance for moisture was made. The custom was in vogue in isolated cases before then, but did not become general until later years. Frank S. Witherbee, of Fort Henry, N. Y., who is with a firm second in the United States as a producer of iron ore, testified that the term iron ore means the ore with water both chemically and mechanically combined. If a pile of 900 tons was placed by the side of a pile of 1000 tons, and the smaller pile was made wet with rain, so that its weight increased to 1000 tons, the intrinsic value of the two piles would be same as before, and they would both be ore, although the water does not increase the metal. Louis E. Stanton, of Crocker Bros., of New York, corroborated the testimony of the water witnesses. The remaining witnesses that were called were George H. Ely, president of the Western Iron Ore Association; William D. Marvel, J. Wesley Pullman, Robert C. Thomas and John M. Hartman. The interest in the suit was very much restricted by the court practically ruling out testimony

which referred exclusively to domestic ores. The salient points of the case were presented in writing both by the defendant and the plaintiffs, and in the charge to the jury the court gave written affirmations or objections to these various points, and then addressed the jury upon the testimony. Without going into the detail of the charge of the court, or attempting to touch upon the various points made, it is fair to assert that the principal issue which the jury had to decide was whether sufficient evidence had been presented to prove that the custom, even in handling foreign ores, is to sell them as ore dried at 212° F., or whether this provision was not expressly stipulated in all or many of the contracts which were made for dry ore. While the Government might have strengthened its case in several points, it was in the main well conducted, and notwithstanding the fact that the ruling above mentioned interfered somewhat with the plan laid out it was evident early in the trial that the plaintiffs would not be able to sustain their claim. It was no surprise, therefore, to find a verdict for the Government returned by the jury after they had been out for the hour which the court took for recess at noon.

Improved Bench Dog.

A new bench dog has been brought out by Larson & Frauman, of Anoka, Minn., who are the sole manufacturers. It is the invention of Frederic Larson, to whom letters



Improved Bench Dog, Made by Larson & Frauman, Anoka, Minn.

patent have been issued covering its essential features. The accompanying cut illustrates the device and the method of its use. As shown here, a block is held in position by the dog, but it is intended to hold a board of any length, limited of course by the length of the bench. The illustration is slightly imperfect in representing an upward curve at the toothed end of the dog. As the device is now made, the dog lies flat, so that a very thin board can be held by it, even down to $\frac{1}{8}$ -inch in thickness. It consists of a longitudinally reciprocating bar, provided with rack teeth on the side to engage with a toothed segmental lever, which is pivoted to the frame and cap-plate. A pawl is placed in front of the segmental lever to secure it in place, a stiff spring causing the pawl to operate automatically as the dog is tightened up to the board by the lever. The objects of the device are, to inclose, protect and guide the sliding dog by a frame extending substantially its whole length, and to afford facilities for securing the dog at both ends to the top of a bench. To fasten the dog to a bench, it is provided at each end with a downwardly projecting pin slightly inclined to the rear to enter holes which are bored in the top surface of the bench, 24 inches apart. The dog is specially adapted to use in cabinet shops for hard wood when very thin material is being worked. It can also be used with advantage by gunsmiths to hold their guns in finishing. It is made of the best malleable cast iron, nickel plated, is 7 inches long, and weighs about 1 pound.

The Lake Fleet.—The magnitude of the commerce of the Northern lakes as described during the present season of navigation is the cause of wonderment. A Cleveland correspondent says: "On account of the very large increase in the tonnage on the lakes during the last few years it is impossible to give an exact statement of the amount of tonnage passing through the St. Clair Flats Canal and the Detroit River, but a fair estimate can be made. In 1887 there were built on the lakes 60 new vessels, all but two of them steamers. Their aggregate carrying capacity in gross tons was 108,525, and total cost \$8,325,000. It is safe to say that the coming winter and spring will see that amount almost duplicated. Cleveland has at the present time a fleet of 229 vessels, with an aggregate registered gross tonnage of 155,188 tons, and a carrying capacity very nearly double those figures. Of these 111 are wooden steam vessels, 10 steel and iron vessels and 109 sail vessels. Detroit and Buffalo follow Cleveland very closely, their aggregate tonnage being not far from 300,000 tons. Chicago has about three-quarters as much as Cleveland, and other ports on the lakes nearly one and one-half times as much. This makes a total of 795,000 tons on the chain of lakes. This entire tonnage, loaded, makes on an average one trip a week through the St. Clair Flats Canal. By reckoning the lake season as 30 weeks, from the 1st of May to the 1st of December, the enormous total of 23,850,000 tons is given as the record of

that little channel for one year. Beside these figures the Suez and all other canals fade into insignificance."

Some time ago we noticed the fact in these columns that the Pittsburgh suspension bridge, connecting the cities of Pittsburgh and Allegheny, was being tested, for the purpose of determining how the bridge has stood the test of wear since it was erected nearly 30 years ago. The inspection was under the charge of William Hildebrand, an engineer of New York City. The inspection was completed on Friday, the 12th inst., and in his report of it to the board of directors of the bridge company Mr. Hildebrand states that the bridge is in as good condition at the present time as when it was finished in 1859, and that with proper precautions the structure will last for 100 years more in perfect security.

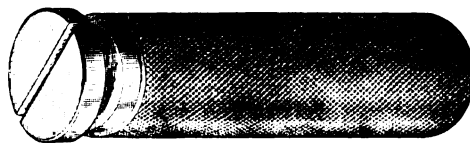
From the Marquette (Mich.) *Mining Journal* of the 29th ult., we take the following table showing the shipments by ports up to date this season, in comparison with shipments for the corresponding portion of the two preceding years:

Port.	1888.	1887.	1886.
Marquette.....	612,212	645,740	684,775
Escanaba	1,545,714	1,606,525	1,151,116
St. Ignace.....	91,311	73,253	55,347
Ashland, Wis..	822,501	866,203	542,340
Two Harbors, Minn.....	279,186	299,063	243,808
Total.....	3,350,924	3,490,804	2,677,366

Standard Reference Disks.

When a gauge or caliper has been long in use the question arises whether constant service has impaired its accuracy. In deciding this question the Standard Reference Disks, of which we annex engravings, are of use. They are also useful for other purposes, being excellent in most instances where there is need of referring to standards. In shape they are round, washer-like pieces, made of steel hardened and carefully ground. The edges are bright, the sides black—a good finish which does not rust.

The disks are used, frequently without handles, for setting calipers, testing measuring tools and determining sizes in shop practice. With handles, they are used as internal cylindrical gauges. They are designed, however, to serve principally as reference, not as working gauges. The diameter of each is stamped upon it in 16ths and also in decimals of an inch. A complete set consists of 45 disks and 6 handles, and is neatly arranged in a suitable box. The $\frac{1}{4}$ -inch and $\frac{1}{8}$ -inch disks are furnished with the handles at-



STANDARD REFERENCE DISKS, MADE BY THE BROWN & SHARPE MFG. CO., PROVIDENCE, R. I.

tached. They are turned out by the Brown & Sharpe Mfg. Company, of Providence, R. I.

New Steel Guns.

The two cast-steel 6-inch guns which are to be submitted to the prescribed test for tensile strength and other qualities, and perhaps will contest the palm of superiority with the Government's built-up guns, are now practically complete, and will before long be forwarded to the proving ground at Annapolis. One is the gun made at Pittsburgh, and finished at the Washington factory. It was cast whole, and the operation was so completely successful that the company wished nothing better, as an example of its system, to be put in competition with built-up guns of the same caliber. The trimming and rough boring having been done at Pittsburgh, it was rifled, sighted and fitted with the breech-loading apparatus at the Navy gun factory. This gun is fully completed, but is perhaps waiting for its fellow competitor, the Thurlow open-hearth steel cast gun, which will be ready within a few weeks. This, also, after being cast and rough bored, was taken to the Government lathe for rifling and smoothing off.

There are also at the Washington factory between 30 and 40 of the standard built-up 6-inch guns, finished and ready to be sent to Annapolis. They will go all together, so that the proving ground will present a busy scene during the remainder of this year. Among them will be the battery of the Yorktown, which is to be the first finished of the new vessels built under Secretary Whitney's administration,

and will be ready about the 1st of December. Last week her engines had a preliminary trial and worked well. Besides the new cast 6-inch guns, the big 10-inch guns attract great interest. One of these was sent to Annapolis for testing long ago, but the official trial awaits the manufacture of a powder of a specified character by the Messrs. Dupont. Two other 10-inch guns will soon be completed, so that the three of this caliber may be proved about the same time. The Miantonomoh, which will be the first of the double-turret monitors completed, is to carry four 10-inch guns, and from present appearances by the time her successors are completed their batteries will also be ready for them. The cost of a 6-inch gun weighing 11,000 pounds is about \$7750; that of a 10-inch weighing 57,500 pounds is about \$20,500.

Torpedo-Boats for the United States Navy.

In a recent number of *Naval Intelligence*, issued by the Bureau of Navigation of the Navy Department, we find it stated that the Stiletto had her final official trials in Narragansett Bay, on August 20, 1887. The trials consisted of a three hours' run over a measured distance. The weather was very favorable, sea smooth, and no wind. The total weight carried was 9 tons 640 pounds, which included 4 tons 540 pounds of coal. The displacement with this load was 31 tons. Draft of water before trial, forward, 2 feet 9

inches; aft, 2 feet 10 inches. After the trial the draft forward was 2 feet 7 inches, and aft, 2 feet 8 inches. The mean speed for the three hours' run was 18.22 knots. The vibration at high speed was moderate. A navy compass was quite steady wherever placed. The mean indicated horse-power developed by the engines was 359. The endurance with 5 tons of coal is computed at 507 miles at a speed of 11 knots. The Stiletto was bought by the United States Government for \$25,000, and turned over to the Torpedo Station on May 28, 1888.

Messrs. Herreshoff, of Bristol, R. I., signed a contract, March 1, 1888, to build for the U. S. Navy a deep-sea twin-screw torpedo-boat, exclusive of torpedoes and their appendages, for \$82,750, of the following dimensions: Length over all, 138 feet; length on deck, 134 feet; extreme breadth, 15 feet; extreme depth, keel to crown of deck amidships, 10 feet. The keel will be rocker-shaped, the draft aft 4 feet 8 inches. The displacement will be about 100 tons, and the horse-power is estimated at 1600. The engines are to be five-cylinder quadruple expansion, driving twin screws. The two boilers are to be of Herreshoff's latest design, and placed in separate compartments forward and abaft the engine-room. Eight bilge-ejectors will give a total discharge of 280 tons per hour. A steam steering engine will be fitted to work a balance rudder of large area. The engines and boilers will be protected by coal. The interior will be divided into 11 water-tight compartments and lighted by electricity. There will be two conning-towers, one forward and one aft, with a search-light on each. The armament is to consist of two torpedo tubes, a torpedo gun aft, and three 37-pounder rapid-firing guns.

A weight of 15 tons is to be carried on trial, which will be a three hours' continuous run. If on a three hours' trial the mean speed of the boat exceeds 22 knots, a premium of \$1500 will be paid, provided the boat is accepted by the Department, for each $\frac{1}{4}$ knot in excess of 22 knots, and \$2000 for each $\frac{1}{4}$ knot in excess of 24 knots. If the speed of the three hours' trial calculated as aforesaid falls below 22 knots a penalty of \$4000 will be exacted. If the speed on trial falls below 20 knots, the Department reserves the right to reject the boat. The contract calls for the completion of the boat in 15 months.

Elastic Traces.

Foreign papers have recently directed attention to experiments which have been made in lightening the work of animals in drawing heavy loads by the use of elastic traces. It appears that some time ago M. Celler, Chief Engineer of Roads and Bridges in France, expressed a doubt whether the traces of leather or rope, or the iron chains, by which horses pull their load, could not advantageously be replaced by more elastic appliances, which would diminish the effort needed at starting, to overcome the inertia of a heavy cart or omnibus. Every one has noticed that a dray-horse is often obliged to use all his weight and strength to start a vehicle which moves along easily enough when once set in motion, and it is quite conceivable that springs in the harness might make the work easier by distributing the movement of starting over a longer period of time. Acting on M. Celler's suggestion, the directors of the Eastern Railway of France began six years ago to harness all the horses employed in shifting freight cars at their Paris station with traces made of chains having a strong spiral spring inserted in them. A large number of horses is employed in this service at the station, and the effect of the change has been very satisfactory. A considerable gain has been made in the durability of the harness, and the regularity of the work, through the diminution of the number of chains broken in the service; while the horses have done their work better and with less fatigue. The blow of the collar on the shoulders at starting is far less violent, and less injurious to the animal than under the old system, and the horses, finding that a strong, continued pressure will effect as much as the jerk which was formerly necessary, seem to gain courage, and pull steadily and directly, instead of wasting their strength in ineffectual plunges. During the six years of trial the directors of the company have become so convinced of the superiority of the new mode of harnessing that it has been adopted in all portions of the vast network of lines under their control.

The Persian Minister at Washington expresses himself freely in regard to men and things in America. He says that if the present Minister to Teheran had been appointed five years ago there would have been a Persian representative in the United States much sooner, and 1000 Persians would have been doing business in this country. The Persian people number 10,000,000, and if a railroad should be built securing local advantages the population would be doubled by the return of subjects who have removed elsewhere. Thus far no concessions have been made to foreigners with this object. It is not impossible that before long the Shah may visit the United States, with whom he is desirous of cultivating friendly relations. Persians desire to see something of American manufactures, as there are many things they desire to introduce.

The Wenstrom Magnetic Separator.

At the New York Metallurgical Works, of E. N. Riotte, 104 and 106 Washington street, a Wenstrom magnetic separator is in operation, Messrs. Scranton & Cook being the agents. The Wenstrom separator has been in use for over four years at Dannemora and at a number of other mines in Sweden, and has therefore passed the experimental stage in which a number of similar machines now coming before the public are still lingering. It differs from them in that it is capable of taking ore in large sizes, so that it is possible to eliminate by concentration a good deal of waste rock without the expense of crushing it to a fine size. The machine has a stationary field magnet, A, Figs. 1 and 2,

The particles of rock in the ore, being non-magnetic, drop off from the barrel almost immediately and fall on the first chute shown in the engraving. It may be noted in passing that the dropping of ore on the barrel in the manner shown tends to lessen the power needed to make it rotate. It runs at a speed of about 30 revolutions, the power required being relatively small. The Wenstrom machine is made in three sizes, the one used in New York having a diameter of barrel of 20 inches and a width of 15 inches. It is rated at a capacity of 3 tons per hour and will take rock up to 1½ inches in size.

The machine is employed not alone for separating magnetic iron ore, but also for converter cinder, mixed machine-tool filings, droppings from cupolas and spent

believe that the settlement of the suits with the railroads is so far in the future that we cannot afford to shut down and wait for their solution. If these discriminations are persisted in, I see no way open to other manufacturers and jobbers except to follow our example. I know of others contemplating the same move, but am not at liberty to give their names."

On the 9th inst., at Dubuque, Iowa, G. B. Mansfield, of the Westphal-Hinds Hardware Company, and other prominent business men of that city appeared before the Iowa Railroad Commissioners to show how seriously their business was being interfered with by the high rates imposed to Iowa points, being in some instances higher than from Chicago to the same points. One case might be mentioned.

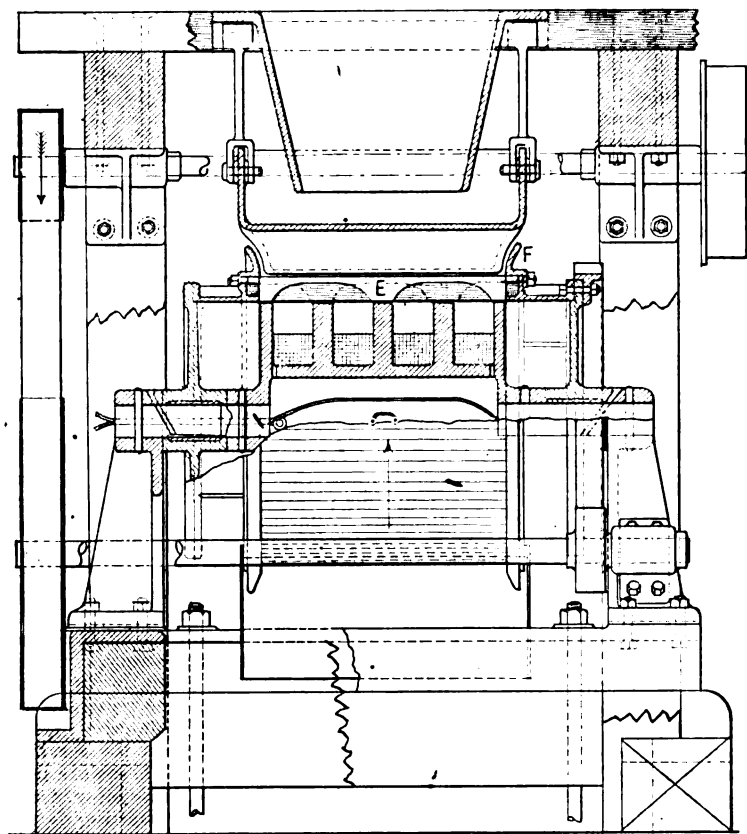


Fig. 1.—Longitudinal Section.

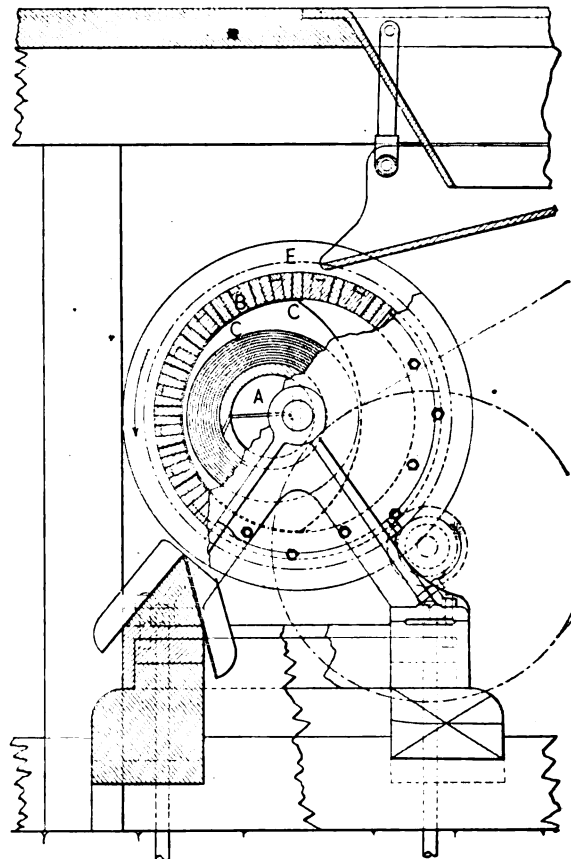


Fig. 2.—Cross Section.

THE WENSTROM MAGNETIC SEPARATOR.

and an armature barrel, E, consisting of a number of soft iron bars, E E, separated from one another by a non-magnetic material—in this case strips of wood. The whole is bound together by non-magnetic end rings F. The bars E E are cut away alternately on the inside to make one bar project only toward the north poles of the magnet and the next only to the south poles, as is shown in Fig. 1 at E and by dotted lines. This gives each succeeding bar opposite magnetism. On each of the four sections of the magnet are wound 15 pounds of copper wire. An Edison dynamo furnishes a current of 10 amperes and 35 volts. The ore is fed to the barrel by means of a hopper, as shown in the engraving, the cylinder turning in the direction of the arrow in Fig. 2. The magnetic ore adheres to the bars of the barrel and is carried downward past the first delivery chute. Below the machine the bars, departing from the influence of the electro magnet, which is placed eccentrically, lose their power to hold the particles of magnetic iron ore and they drop off.

foundry sand and for shot at blast furnaces. It has been employed for such uses at a number of places in Sweden.

The Effect of Iowa Freight Rates.

That the cry of distress which has been wrung from Iowa shippers is genuine is proved by the announcements now being made of intended removals of business establishments from the State. We are in receipt of the following letter on this subject from R. E. Sears, president of the Iowa Barb Steel Wire Company, of Marshalltown, Iowa, written under date of the 10th inst.:

"We have decided to move our machinery East, but have not decided on the location; will wait until after the election. Our reason for doing so is that the railroads have so arranged their freight rates that the discrimination against us places us at such a disadvantage that it is impossible for us to compete with those who are manufacturing at points east of Chicago. We have been hoping for relief, but now

It was alleged that the rate to Mona on the Illinois Central was 22 cents from Dubuque, while from Chicago to Lyle, one mile north of Mona, the rate on the same road was 15 cents. The general manager of the railroad company, who was present, challenged the statement, but the production of freight bills caused him to withdraw his challenge.

The people of Iowa, who are endeavoring to build up manufacturing towns and trade centers in their State, are beset with serious troubles, and it will not be surprising if the example of the Iowa Barb Steel Wire Company has numerous followers.

The construction of a pipe line to convey natural gas to Wabash, Ind., from wells 14 miles distant, began on the 12th inst. Manufacturers are to be supplied at a nominal price and domestic consumers at a very low rate. Six-inch mains will be used. The line is to be perfectly laid and to be finished by the 1st of November.

Recent Legal Decisions.

TELEGRAPH COMPANY—ACTION BY SENDER OF MESSAGE AFTER PAYING DAMAGES.

W. C. S. & Co., brokers in Richmond, Va., wrote to P. at Charlotte, N. C., as follows: "If your customer will offer 100 shares (or any part of them) C. C. & A. R. R. stock at 43, delivered here, please wire us at our expense." Ten days later P. delivered a message to the Western Union Telegraph Company, addressed to W. C. S. & Co., which was as follows: "Party offers 100 shares C. C. & A. stock at forty-three. Answer quick." This message went delivered to W. C. S. & Co. with the price changed to "forty" by dropping negligently the word "three." Two hours after this telegram was transmitted, W. C. S. & Co. replied by wire: "Will take the hundred shares; draw at sight with stock attached." P. sent the stock and drew for \$4300; W. C. S. & Co. refused to take the stock, and as they had sold it at 41½, they had to buy it at that price to fill their contract, and they sued P. in a Virginia court and recovered their loss. P. gave the telegraph company notice of this suit that it might appear and defend it, but it took no notice of this alleged duty. P. paid the judgment and sued the company to recover the amount paid, but was defeated, and he carried the case—*Pegram vs. Western Union Telegraph Company*—to the Supreme Court of North Carolina, where the judgment was affirmed. Judge Morrison, in the opinion, said: "1. The plaintiff here, P., was not liable to W. C. S. & Co. for the loss suffered by them. They should have looked to the telegraph company. The message delivered to them was not P.'s message, and no contract was made by him through it. 2. Plaintiff cannot recover the amount paid by him in the action brought against him by W. C. S. & Co., for he was not liable to them, as we have stated; and there was no contract of agency between him and the company by which he can hold it responsible for the payment made by him. Not being liable to W. C. S. & Co., he cannot claim any indemnity from the company for his payment."

PREMIUMS OR GIFTS WITH SALES.

G. was convicted of selling food and giving away, as part of the transaction, a premium, in violation of the statute (Sec. 335 a, New York Penal Code), which provides a penalty against "any person who shall sell, exchange, or dispose of any article of food, or offer or attempt to do so, upon any representation, advertisement, notice, or inducement that anything other than what is specifically stated to be the subject of the sale or exchange is or is to be delivered or received, or in any way connected with or a part of the transaction, as a gift, prize, premium or reward to the purchaser." In this case—*People vs. Gillson*—on appeal, the Court of Appeals of New York, reversed the judgment. Judge Peckham, in the opinion, said: "Here the offense, as set out in the warrant, was the delivery of a tea-cup and saucer by the Great Atlantic and Pacific Tea Company, to one A., on a purchase by him of 2 pounds of coffee from it, the company having announced or advertised that such a gift would be made to a purchaser of 2 pounds of coffee. The defendant contends that the statute is void, as it interferes with his 'liberty' as secured to him by the constitution. 'Liberty,' in its broad sense, as understood in this country, means the right, not only of freedom from servitude, imprisonment or restraint, but the right of one to use his faculties in all lawful ways, to live and work where he will, to earn his livelihood in any lawful calling, and to pursue any lawful trade or avocation. It is quite clear that some or all of these fundamental and valuable

rights are invaded, weakened, limited or destroyed by the legislation under consideration. It is, evidently, of that kind which has been so frequent of late—a kind which is meant to protect some class in the community against the fair, free and full competition of some other class; the members of the former class thinking it impossible to hold their own against such competition, and, therefore, flying to the legislature to secure some enactment which shall operate favorably to them, or unfavorably to their competitors, in the commercial, agricultural, manufacturing or producing fields. By the provisions of this act a man owning articles of food which he wishes to sell or dispose of is limited in his powers of sale and disposition. It is lawful to sell coffee, and the defendant here may be satisfied to take a less profit upon a single sale by making the gift, because he can thereby increase his sales and have a greater income by reason of a greater business at the end of the year. This statute, if valid, steps in to prevent his adopting such a course to procure trade, and from it to secure an income and livelihood for himself and his family. It is contended here that the statute should be upheld on the ground that its enactment is a proper exercise of the police power of the State: 1. Because the transaction is in the nature of a lottery, indeed, the statute is placed in the Penal Code under the head of 'lotteries.' 2. That the sale of impure, unwholesome and adulterated food is thereby hindered. We are of opinion, however, that the words of the statute cannot be construed to have been intended to defeat a lottery or to declare that the sale of bad food would thereby be interfered with. The conviction must be reversed, and the defendant discharged. All of my associates concur in this judgment."

BANKING—LETTER OF CREDIT.

A firm in New York requested a bank to open a telegraph credit on its account in Hong Kong, China, as follows: "Please telegraph authority to Vogel & Co., Hong Kong, to draw at 6 months for our account against consular invoice and full set bills of lading of 2000 bales manila hemp, p. Robinson, at the rate of 4 pounds p. bale, on a basis of 8 shillings sterling, freight filled up in bill of lading, reducing advance, if higher." This credit was wired, and a letter of credit was sent by the bank to Vogel & Co. next day for £10,000. Under the telegraphic authority Vogel & Co. made three drafts amounting to £8080, at six months, on account, as stated on the bills, of 2020 bales of hemp, and the drafts were accompanied with letters of advice, which informed the bank that they were drawn against these bales of manila hemp, which had been forwarded by the ship Robinson, as directed. The drafts had been accepted by the bank's agents in London, through whom the credit had been wired, before the ship arrived in New York. Instead of shipping 2020 bales of manila hemp but 500 bales were sent, the remaining bales containing rolls of matting. To each draft was attached a bill of lading for "bales of merchandise," "weight and contents unknown" and Vogel & Co., on each bill of lading, after the captain had signed them, and without his knowledge, indorsed an abstract of invoice for "bales of manila hemp." The bank paid the acceptances, but the firm refused to pay the bank, and an action was brought against it. Vogel & Co. had absconded. Judgment was given on a draft which covered the 500 bales of hemp, but denied for the balance, and the case—*Bank of Montreal vs. Recknagel*—was carried to the Court of Appeals of New York, where the judgment was affirmed. Judge Gray, in the opinion, said: "If Vogel & Co., in any material matter, failed to comply with the terms

and conditions of the cable credit, the plaintiff's London agents accepted their drafts at their peril. Defendants cannot be held liable except upon actual consignments of manila hemp. The term "documents" in the cablegram clearly meant, in the minds of merchants and bankers, consular invoices and bills of lading. The difficulty has arisen here from the failure to specify in the bills of lading the kinds of merchandise which the defendants had authorized the plaintiffs to accept against them, and in the acceptance of drafts which were not against shipments of that kind of merchandise at all. Letters of credit are governed by the same legal principles as are all contracts. The credit here was authorized upon certain conditions prescribed by the parties to be ultimately bound, which they not only had the right to make, but which were assented to by the plaintiff. It is difficult to see how parties could more particularly define the terms of their engagements than was done in this case. It is urged that all commercial instruments are to be liberally interpreted, so as to protect persons who give credit on the faith of them. But that principle only applies where the provisions of an agreement are ambiguous, loose, or are susceptible of more than one interpretation, which is not the case here. The master of the ship should identify the goods for which he gives a bill of lading; that could have been done here; but whether it was done or not, this case cannot be controlled by it. The agreement between the parties was a definite one, and it must be enforced."

Refilling Collieries.

Among the economical inventions recently introduced at Shenandoah by the Reading Company is a device, at the Kohinoor Colliery, for refilling the excavations from which coal has been mined. The method of doing this is both simple and effective, and prevents the caving in of the earth above, and the consequent loss of valuable property, which has not been infrequent in the mining towns of the anthracite region. Besides, the valuable pillars of pure coal, which for many years it was customary to leave in the mines, to prevent falling in of the roof, can now be taken out without fear. A coal-dirt conveyor, consisting of a series of semi-circular shuttes, similar to those used in discharging coal from carts into cellars, commonly used in this city, and an endless chain with scrapers attached automatically conveys the fine refuse from the coal breakers to an elevation, from whence it is discharged into a second shutte. As the coal dirt falls on the second shutte the water pumped from the interior of the mines mixes with it and carries the fine coal dirt, in a semi-liquid state, back through a jig or puddling hole into the bowels of the earth, from whence the coal has been removed. The coal dirt settles to the bottom of the breasts and packs closely, and the water seeks an outlet below, to be again pumped out to repeat its duty. The cost of thus puddling the refuse matter back into the mines, about 3 to 4 cents per cubic yard, is comparatively very small compared with the value of the pillars of marketable coal of which the mines may be safely "robbed," and the security obtained for dwellings and railroad property on the surface, above the mines. Already more than two acres beneath the city of Shenandoah, from which the coal had been mined, have been again solidly refilled with the coal dirt which used to be piled mountains high around the town.

The St. Louis Malleable Iron Works, at St. Louis, continue idle, and will probably not resume operations before next year.

THE WEEK.

Respecting the operation of the Interstate law, President Adams, of the Union Pacific Railroad, is quoted as saying that he thought the new statute is greatly responsible for the demoralization of railroad affairs, and experience has shown that it is not based upon sound principles. The inability of roads to make lower rates on traffic between large commercial centers and intermediate local points, he says, has the effect of driving the business away from large points, and the prohibition on pools is leading to a general consolidation of roads. The weaker lines, being unable to compete against the stronger lines on even terms, will be absorbed by them.

There are 427 miles of street sewers in New York City. The total revenue from the Croton water service for the quarter was \$1,033,777.62.

Canada's commerce is severely crippled by an extensive wash-out on the Cornwall Canal, by which transportation seaward by water is summarily closed, and at a busy season of the year, when everything that could carry cargo was pressed into the service. Large quantities of grain were in transit, so that the forwarding companies suffer considerable losses.

Millions in the shape of rich gold-bearing quartz are visible at Douglass Island, in Alaska, where Senator Jones, of Nevada, has a great stamp mill of 240 stamps, rated as the largest of its kind in the world. A Sitka correspondent says this year the mill made further enlargements, until \$500,000 has been invested in the plant. The company have acquired quartz ledges along the face of the mountain for a distance of 9000 feet alongside of deep water. The mill hugs the foot of the hill quite closely, and higher up, not more than 500 feet, is the foot of the quartz quarry. The excavation in the side of the mountain resembles a giant stone quarry from whose sides are blasted in the open air hundreds of tons of gold-bearing quartz rock for the use of the stamp mill. A tramway carries the quartz to the mill, where, with water and pounding machinery, it is reduced to powder and then borne to the chlorine works 400 or 500 yards away, where the impalpable and invisible gold is separated from the dross and dust. The amount of gold-bearing quartz exposed to sight at that one point alone is enough to keep the mill in operation for an indefinite number of years.

A frightful railroad disaster occurred at Mud Run, on the Lehigh Valley Railroad, caused by the engine of one train crashing through the rear cars of the preceding train, all of which were crowded with excursionists. At least 64 persons were killed outright, a large proportion of them young men and boys belonging in Pleasant Valley and neighborhood. It does not appear that the signals were properly managed.

There are at least a dozen steamships in the tropical fruit trade which ply between the island of Jamaica and ports in the United States. A few years ago the trade was confined almost exclusively to small sailing vessels delivering their cargoes in New York. Philadelphia and Baltimore now divide the business. The island of Jamaica is destined to become one of the great fruit gardens of the world. The exports of bananas last year comprised nearly 2,000,000 bunches, all to the United States. Exports of coffee and ddyewoods likewise largely increased.

Pratt's Standard Oil Works in Williamsburg were burned on the 11th inst. The fire broke out in the hold of the oil steamer Hafia, lying at the dock, and quickly communicated to the buildings and tanks.

The bark Ella Vose and the Philadelphia and Reading Elevator were also burned. The loss to the latter is \$25,000, fully insured. The total loss is estimated at nearly \$500,000. The estimates as far as made are: Storage building, \$50,000; oil in barrels, \$50,000; docks and bulkheads and pipes, \$75,000; steamship Hafia, with cargo, \$110,000; bark Ella Vose and cargo, \$40,000; coal yards, \$20,000; other vessels and lighters, \$20,000; total, \$365,000.

The importance of American trade with Cuba appears from the single fact that in September, out of a total of 75 vessels, measuring 85,241 tons, arriving at Havana during the month, 37 vessels, of 33,075 tons, were American. British vessels numbered only 5.

Out of 18 strikers who went out of a carpet factory in Astoria, last week, only three were American citizens. The weavers objected to an American citizen learning the trade.

Plans for the Merchants' bridge at St. Louis, one terminus of which will be at Venice, in Illinois, have been adopted. There will be three spans of about 600 feet each, and the structure will cost \$1,500,000. The enterprise is a movement against Gould. The construction of the Union Railroad Bridge which the Wheeling and Harrisburg Railroad Company are building over the Ohio River at Wheeling has been begun. It will reach all the roads centering at Wheeling, West Va., and it is to be 3100 feet long. It will be finished in 1890.

Illinois farms are mortgaged to the extent of \$142,000,000, and the total mortgages on lands, lots and chattels is \$402,000,000.

The Turkish Government has decided to establish an arsenal, a dockyard and harbor works at Jeddah, and to station a flotilla for service on the Red Sea.

Proceedings having been commenced by the Attorney-General of this State to test the legality of the combination of sulfur refiners, the public are interested to learn the facts. The capital of the Sugar Trust is \$50,000,000, and its profits have been so enormous that within the past year they have declared five dividends of 2 per cent. each, or a total of 10 per cent. on the capital. It was found, however, that with the whole number of factories, the amount of sugar produced was in excess of the supply, hence these factories were shut down by order of the Executive Committee of this sugar octopus and 1000 men were thrown out of employment. The value of the property originally put into the trust was from \$15,000,000 to \$20,000,000. It was capitalized for \$45,000,000 and then increased to \$50,000,000. The profits last year of 10 per cent. were declared upon this inflated capital. The original \$20,000,000 represents the value of the property. The actual dividends upon this investment, therefore, are fully 25 per cent.

The Park Department in this city ask for \$2,000,000 for the coming year to defray the cost of a tunnel under the Harlem River at Seventh avenue and 155th street.

It is announced that the Suburban Railroad, of this city, which now runs on Third avenue nearly to 167th street, will be extended to the Bronx River, bringing into market several hundred acres of elevated land commanding fine views of the East River and the Sound.

From Adelbert Hamilton's analysis of railroad indebtedness in the United States it appears that the aggregate is more than four times as great as our national debt, and is mainly payable within the next 25 years. The annual interest charges, which are of course paid by the traveling and shipping public through fares and freights,

are equivalent to a tax of \$3 per annum upon every individual in the United States; and this, it is to be remembered, is about one-half as great as the aggregate taxation by the Federal Government through tariff and internal revenue collections.

France follows India in offering large premiums for the invention of a machine for decorticating ramie fiber, which in gloss and luster approaches the finest silk and promises to become invaluable.

The Georgia School of Technology, the only technological school which is purely a State institution, was opened in Atlanta on the 5th inst., and transferred by the commissioner who had charge of its erection to the trustees of the State University, of which it is part. The school starts with about 100 students.

The Union Trust Company have bought the buildings Nos. 78 and 80 Broadway and 5 and 7 New street for \$775,000.

Since the organization of the warehouse trust in Brooklyn and the advanced rates for wharfage and storage the bulk of the business on the water front has been transferred to Jersey City and Staten Island.

German troubles in East Africa are looked upon in England as masking a scheme for territorial acquisition.

The Treasury Department has decided that wire mattresses are not furniture within the meaning of the Tariff act, but are dutiable at the rate of 45 per cent. ad valorem as unenumerated manufactures of metal.

The value of the industrial products of Philadelphia increased between the years 1850 and 1880 from \$63,784,212 to \$152,355,318—a greater rate of increase than was ever made in an equal period before or since in the city's history.

A circular from the Marine Hospital service prescribes stringent regulations for the disinfection of all vessels which are liable to bring the germs of contagious disease.

The decision of the Supreme Court of Utah dissolving the corporation of the Mormon Church and forfeiting to the Government the estate of the Church, valued at more than \$1,000,000, is a blow which foreshadows the disintegration of Mormon institutions.

The Senate confirmed the nomination of James P. Lesesne, of South Carolina, to be consul general at Melbourne.

Louisiana sugar manufacturers are said to have expended fully \$1,000,000 within the past year for improved machinery. Each plantation of any size has its own sugar mill, in several instances at a cost of \$40,000.

Rumor has it that the stern frames of the cruiser Baltimore are cracked as the result of faulty cooling. This is contradicted by the officials, who say that all that has gone wrong with the Baltimore is the breaking of one of the rudder clutches by the scow which ran into her recently, and that the damage can be repaired for \$200.

Wm. B. Franklin, Commissioner-General, and Sommerville P. Tuck, Assistant Commissioner-General, for the United States to the forthcoming Paris Exposition, which opens next May, have been in Washington for the past several days conferring with the Secretary of State and other heads of departments respecting the Government exhibits at the exposition and details of the work devolving upon them. They report commendable progress in their preliminary work. Thousands of circulars have been distributed from their headquarters in New York city to manufacturers throughout the country, and to

leading men in all industries; and they are daily in receipt of applications for space at the exposition. These applications, the Commission announce, will not be acted on until about the 1st of December, in order that when all are in they may make an equitable division of space among intending exhibitors.

The proposed Bay of Fundy ship railway canal has been put under contract. A dispatch from Ottawa says that T. C. Keefer, President of the American Society of Civil Engineers, has received a cablegram from London announcing that a contract for the construction of a ship railway from the Bay of Fundy to Baie Verte, Gulf of St. Lawrence, has been finally settled. Mr. Keefer is one of the provisional directors named in the act of Parliament incorporating the Chignicté Marine Railway Company. The works will probably cost \$5,000,000.

The *Financial Chronicle* has the following estimate of wheat supply for the current year:

	Bushels.
Stock of last crop left over July 1, 1888.....	56,617,127
Crop estimate now made.....	411,000,000
Total supply.....	467,617,127
Consumption to July 1, 1889.....	286,110,000
Needed for seed.....	85,000,000
Export, say.....	100,000,000—421,110,000
Left over for stock.....	46,507,127

To last year's consumption should be added 2 per cent., about the rate of population increase, and to last year's figures for seed 1,000,000 bushels; still there remains 100,000,000 for export, with 46,500,000 left over for stock.

The new Mexican National Railroad has been completed, and the roadbed and bridges have been thoroughly tested. The formal opening of the road will not take place, however, until November 1. This new route to the capital at once gives importance to the City of San Antonio, which gains vastly as compared with the routes hitherto open via Eagle Pass and via El Paso.

Extensive orders for rolling stock for railroads have been placed lately in order to meet the pressing demand for transportation. Besides a large addition now making to the equipment of the Pennsylvania Railroad, the Central Railroad of New Jersey is arranging a contract for the construction of 30 new consolidation locomotives, with the Wooten fire-box, to burn anthracite buckwheat coal; 2000 40 and 50 ton cars have already been contracted for, of which 1500 are coal cars and 500 box freight cars, and in a few days an additional order for 30 fine passenger coaches will be awarded. The new cars will be built partly at Milton, Pa., and partly at a car works in the Lehigh Valley. McKee, Fuller & Co., at Fullerton, Pa., have secured a contract for building 2000 gondola cars for the Lehigh Valley Railroad, for which the Catasauqua Iron works is to supply the iron bars and other iron materials.

The whole of the new embankment of the Yellow River, begun last autumn, and carried on at a cost equal to over \$9,000,000, has been swept away by the recent flood. Nearly 1000 laborers who were on the bank were drowned.

A dispatch from Albany, N. Y., says: "In the action of Edgar Bronk against the Albany Penitentiary Commissioners, to test the question by injunction as to whether the convict labor law applies to county penitentiaries, Justice Mayhem, of the Supreme Court, has handed down a decision which in effect holds that the law passed last July, in regard to the employment of convicts in the manufacture of articles used in the prisons and reforma-

tories, does not apply to the penitentiaries, which are controlled by the authorities of the respective counties in which they are situated."

A syndicate of capitalists, at Buffalo, comprising John Kelderhouse, Thomas Maytham, M. M. Drake, Berriman Bros., H. G. Trout, James Gibson and others have closed a contract with the Union Dry-Dock Company for the construction of a steel steamer, capacity 2500 tons, to be out next spring. Keel 260 feet, beam 40 feet, hold 23 feet; fore and aft compound engine by Trout; two steel boilers by Lake Erie Works, which take an interest in the boat. Captain James Gibson of the Lackawanna will sail her. Cost, \$160,000.

The Philadelphia Bridge Works have a contract for 5,000,000 pounds of beams, girders, &c., for the Jersey Central Railroad, to be used in the construction of its handsome new depot at Jersey City, and in the building of new bridges and replacing of old wooden or weak iron ones on the lines of the company.

The Maine shipping business is active. Quite a number of square-rigged vessels have sailed from Bangor to the Mediterranean with fruit boxes and others to Scotland with spool stock.

An island has suddenly risen $3\frac{1}{4}$ feet above the surface of the water in the harbor of Vera Cruz. The city itself was recently visited by a cyclone, an earthquake and a water-spout.

Enormous quantities of iron tubing will be required within the next year or two to supply the demands of the telegraph and telephone companies, some of whom are now busily engaged in laying conduits for their underground wires. Already large orders have been placed for tubing for this purpose, which accounts for the present unusual activity of the pipe mills, and this has caused a big demand for skelp.

The powder works at Mountain View, in Passaic County, N. J., lately owned by the Lafin & Rand Powder Company, also those at Pompton, have passed into the control of the Standard Oil Company.

A special cable dispatch says: "Every detail of the Pacific Mail contract is now definitely settled between the Imperial Government and the Canadian Pacific Railway Company. The contract stipulates that the service shall commence in 18 months, the company receiving \$225,000 annually from the Imperial Government, in addition to \$75,000 from the Dominion, for a monthly service for ten years from Vancouver, not only to Yokohama and Hong Kong, as at first intended, but also calling at Shanghai. The whole efficiency of the Canadian route to the East now depends on the Atlantic service."

Dr. Warner, who lately erected the Seaside Institute for Working Girls, in Bridgeport, Conn., at a cost of \$60,000, has just subscribed \$20,000 for a building for the Young Men's Christian Association in that city, of which he is president. This is the outcome of a lecture delivered by Dr. Lucien C. Warner, of New York, the philanthropist who has just erected the library at Oberlin, Ohio, at a cost of \$75,000.

The horse-car strike in Chicago has been ended by mutual concessions, but new difficulties threaten, on account of the retention in service of new men who volunteered to fill vacant positions.

There are now being shipped from Middletown, N. Y., a lot of the largest flagstones ever quarried in the United States. They are intended to form the sidewalk in front of Frederick Vanderbilt's new house on Fifth avenue, New York. There are 20 stones altogether, and each is 20 feet long, 10 to 15 feet in width and about 12

inches thick. It is estimated that the stones when laid down in the walk in New York will have cost \$1000 apiece.

Bilbao, the great iron port of Spain, is being improved at a cost of 30,000,000 pesetas, and to reimburse the Government it is proposed to put an export duty of 25 centimes per ton on all minerals going out of the port.

The Soo Line, which has done so much to demoralize the railroad affairs of the Northwest, has given notice of an advance of rates from New York to St. Paul and Minneapolis, to go into effect on the 20th inst. The new rates will be as follows, with comparisons:

From New York, via the New York, Ontario and Western:

	Class					
	1	2	3	4	5	6
Present rates.....	\$0.91	.75	.64	.46	.36	.29
New rates.....	1.00	.91	.71	.47	.40	.33

From New York via Canada Atlantic:

	1	2	3	4	5	6
Present rates.....	\$0.80	.50	.40	.30	.24	.20
New rates.....	.95	.68	.58	.44	.38	.31

Under the new rates it is thought Chicago will have no advantage, for the through rate from New York via that city to the Northwest will be 6 cents higher than the Soo rate on first-class freight, 2 cents higher on the third, fifth and sixth classes, and 4 cents higher on the fourth class.

The city of Newark has an estimated population now of 160,000. According to the census of 1880 it was then 136,508, and 29,983, or 61 per cent., of the inhabitants were engaged in manufacturing and mining.

Most of the lines of transportation in Florida and coastwise have resumed their freight service.

The canning industry of Maryland alone comprises 488 canning houses, with 25,000 employees, who receive over \$10,500,000 in wages annually. About 22,000,000 cans are required to contain the oyster product, not to speak of the demands for packing fruits and vegetables.

At the American Institute Fair the machinery is in complete running order and the great Corliis engine is doing good work.

A very large factory for the manufacture of plate glass, the largest of its kind in the United States, has just commenced operations at Ford City, on the Lehigh Valley Railroad. The structure is 2000 feet long, with a galvanized iron roof and will contain six melting furnaces. The firm expect to make 20 plates of glass a day. In the grinding and polishing rooms are some massive machines, made on the grounds at the foundries and machine shops. They will use over 2000 tons of iron in their machinery. The polishing tables are to be run by a traction cable, working on the same principle as do the street railways. There are from 300 to 400 men employed now by the firm, and they expect when they are running in full blast to work about 1200. The furnaces, boilers, &c., are all heated by natural gas.

There is no cessation in the effort to introduce improved steam-heating processes on the various railroad lines. By January 1 the New York and New England line will have between 80 and 90 cars warmed by the New York Safety Car Heating and Lighting Company's system.

Harnessing the Niagara cataract is once more receiving attention in Buffalo, as the 582 inventors who have responded to the offer of a \$100,000 prize for the best "harness" are becoming restless. Last week a committee of citizens appointed a committee to devise a plan of organization, in order that the necessary data may be prepared by competent hydraulic engineers to put the matter in shape for competition.

MANUFACTURING

Iron and Steel.

A new process in the manufacture of crucible cast steel, known as the Kingsland-Sinclair process, has recently been invented by Le Roy Kingsland, of Pittsburgh. An experimental lot of steel was recently made by this process at the steel plant of Howe, Brown & Co., Limited, in that city, which has been tested by the Motive Power Construction Department shops of the Pennsylvania Railroad Company, at Altoona, Pa., and also by Miller, Metcalf & Parkin, at Pittsburgh, giving satisfaction. The point claimed by the inventor for his process is that a crucible steel equal to the celebrated brands of Mushet steel can be produced for about one-fifth the cost of the above-named brand.

The new plant of the Allegheny Bessemer Steel Company, at Duquesne, Pa., is rapidly nearing completion, and it is expected to be ready for operations by January 1. The Bessemer department is already finished, and filled with the most modern machinery. In the rail mill hydraulic working machinery will, in nearly every instance, take the place of roll-hands, furnacemen, shearsmen and hot-bed men.

M. V. Smith, of Pittsburgh, has received the appointment of consulting engineer to the Union Steel and Iron Company of St. Joseph, Mo., which has recently been organized.

Oliver Bros. & Phillips, of Pittsburgh, will commence work soon on the erection of a soaking pit furnace in their Thirtieth street steel works.

The car-wheel foundry mentioned some time since as projected at East Chicago, near Hammond, Ind., is now in course of construction. The principal owner is C. A. Treat, of the C. A. Treat Mfg. Company, Hannibal, Mo. The new plant is to be of the most approved character. The buildings will be of brick, with iron roofs supported by steel trusses, and they will be equipped with hydraulic cranes, improved pits, &c. The capacity of the foundry will be from 200 to 250 wheels daily.

In the Pittsburgh papers recently was published a statement to the effect that the plate mill of Shoenberger & Co., of that city, had resumed operations after an idleness of six months. This statement is erroneous, as the plate and sheet mills of this firm have been in continuous operation for some months past with plenty of orders on hand. The firm have recently started up their nail plate train, on which tack plate is being rolled to be sold to outside concerns. The firm are not making any nail plate for their own use, as their nail factory has been closed down since July last and will be idle for an indefinite period.

The Clinton Rolling Mills, at Pittsburgh, formerly owned by Graff, Bennett & Co., and which have been idle since the assignment of that firm some months ago, have been put in operation by the syndicate of creditors who purchased the plant at the recent sale. A majority of the old employees were given positions in the works. Clinton Furnace, which supplies pig iron for the plant, is also being operated by the same syndicate, and is producing about 50 tons of pig iron per day.

Dilworth, Porter & Co., Limited, proprietors of the Glendon Rolling Mill, at Pittsburgh, started up their plant on Monday, the 18th inst., with non-union men. The firm manufactures railroad and boat spikes exclusively, and is the only firm

in Pittsburgh employing workmen belonging to the Amalgamated Association that has not signed the Amalgamated scale, in consequence of which their works have been idle since July last. In order to fill their orders and retain their customers the firm have been purchasing spikes for some time from Richmond, Va. It is thought that the firm will have no trouble to secure a full complement of hands to operate the works.

The Cambria Iron Company's new Bessemer steel works will be completed and ready for operation by January 1. They will have a capacity of from 1000 to 1500 tons per day.

W. D. Wood & Co., Limited, of Pittsburgh, manufacturers of the well-known patent planished sheet iron, whose works are located at McKeesport, Pa., are erecting a new office at that place, and when completed the present office of the firm, on Water street, Pittsburgh, will be abandoned.

We are informed that the report that the plant of the Elba Iron and Bolt Company, Limited, at Pittsburgh, would resume operations in a short time, is without foundation. The works have been idle since the assignment of the firm some months ago.

The nail factory of the Belmont Nail Company, at Wheeling, W. Va., which has been closed down for some time undergoing repairs, has resumed operations in all departments.

Florence Furnace, of the Henderson Iron Company, at Sharpsville, Pa., which was blown out last month for the purpose of relining and repairs, will resume operations again about November 1st next.

The American Wire Company, of Covington, Ky., are adding to their plant a Garrett rod mill of 100 tons capacity, and a wire mill of 75 tons capacity, double turn, to be in operation February 1.

For some weeks preparations have been under way for resumption of work at the Pottsville Iron and Steel Company's Fish-back Steel Works. The fires were lighted on Monday morning after several months' idleness.

Negotiations are now pending for the transfer of the Marine Iron Works, of Bath, Me., to Gen T. W. Hyde. It is probable that the works will be started up without delay and run in conjunction with the Bath Iron Works.

From a recent issue of the *Age of Steel*, St. Louis, we take the following: "The Laclede Plate and Sheet Mill Company will likely go out of business as a distinct organization, having decided by vote to do so, we understand from a member of the company. The last of their manufactured stock at the Laclede Rolling Mills has been sold, and was shipped out last Saturday. But the impression prevails that Mr. Pad-dock, the president of the company, would be willing to lease and operate the Laclede property if it could be had on satisfactory terms. Meanwhile the mill is lying idle, owing to differences between the owners and the several parties negotiating for its use."

A Westmore furnace is being built at Hackettstown, N. J., on ground donated by the Warren Iron Company, to experiment with the reduction of zinc ores. This is to be followed by a furnace for producing iron direct from the ore.

On the morning of the 7th inst. a gas explosion occurred at the Rosena Furnace, New Castle, owned by Oliver Bros. & Phillips, of Pittsburgh. The blast had been shut off from the stack for a few minutes, and the stopping of the air current caused a reaction which filled all the

air-pipes with gas. This ignited and exploded. The air-pipes were shattered and the three blast engines badly damaged. An area of 2000 square feet was blown from the boiler house. Several workmen narrowly escaped death, but no one was injured. The loss is estimated at \$8000.

Machinery.

The American Engine Company, of Cedar Rapids, Iowa, have consolidated with the American Nail Machine Company, of Findlay, Ohio, and formed a company with a capital stock of \$250,000. The works being built by the latter company will be doubled in size, and in connection with nail machines the firm will manufacture high-speed engines from 100 to 300 horse-power.

The Beckett Foundry and Machine Company, Arlington, N. J., have succeeded the Beckett & McDowell Mfg. Company. The works, both foundry and machine shop, have been increased, and new tools added, so as to double their former capacity. They expect soon to begin the manufacture of Corliss engines.

The Jeffrey Mfg. Company, of Columbus, Ohio, manufacturers of the Legg Coal Mining Machines, report heavy shipments.

The Lincoln Iron Works, of Rutland, Vt., have just issued a new catalogue, illustrating and describing their various stone and marble working-machines and hoisting engines for quarries. The catalogue is very attractively arranged, and is in all respects a creditable specimen of trade publication.

D. B. Cruickshank, dealer in machinery, Providence, R. I., reports the following sales of machinery: A 150 horse-power Corliss engine to the Miller Soap Company, of Lancaster, Pa.; a double cylinder hoisting engine to the Pottsville Iron and Steel Company, of Pottsville, Pa.; a 20 horse-power boiler to C. H. Eglee, of Mystic, Conn.; a 6 horse-power engine and boiler to Daniel Howe & Hope, Rhode Island; a 10 horse-power boiler to Palmer & Goss, Fall River, Mass., and two boiler feed pumps to W. A. Harris's Engine Company, of Providence, R. I.

Davies & Thomas, founders and machinists, of Catasauqua, Pa., are engaged in the erection of a large addition to their foundry department. The new building will be frame, 40 x 190 feet in dimension, with corrugated roof, and is being erected adjacent to the present foundry. When completed, it will greatly increase the present capacity of the plant.

William Tod & Company, of Youngstown, Ohio, have under way rolling-mill engines for the Lake Erie Iron Company, of Cleveland, Ohio; the Harvey Steel Company, of Newark, N. J., and a pair of specially designed engines for the tire mill of the Latrobe Steel Company, of Latrobe, Pa., of about 1000 horse-power. They are also building some heavy rail straighteners, with engines attached, for the Johnson Steel Street Rail Company, of Johnstown, Pa.

Hardware.

The Union Indurated Fibre Company, New York, report a very satisfactory sale of their dry and liquid measures, which are referred to as having received the endorsement of the city sealers of weights and measures in New York.

Freeman Wire Company, St. Louis, Mo., are making some important improvements in their mills at St. Louis. The plain wire mill is being overhauled, so that its capacity will be increased to some 50 tons daily output, and a new Corliss engine of 250 horse-power is being put in with additional blocks for fine wires. The company are also building a new baker with

improved features, so that it is expected that one man will handle the same quantity of work as has heretofore required the services of three men. They are also putting ten new two-point machines in their bar plant, and are building an electric-light plant, which will light up both of their mills. The office and salesroom of the company have been moved to 410 North Main street, St. Louis, where they have just completed the putting in of some machinery for manufacturing bank, store and office fixtures, elevator inclosures, stable fixtures, window guards, iron crests and iron and wire fences.

The Challenge Wind Mill and Feed Mill Company, of Batavia, Ill., are enjoying a heavy export trade, particularly to South America. They have recently taken large orders for the Argentine Republic, and are making shipments to Brazil via Rio Janeiro. Their home trade, which is their mainstay, is also reported to be in excellent shape.

Hussey, Binns & Co., Limited, shovel manufacturers, whose factory is on Twenty-seventh street, Pittsburgh, report a marked improvement in trade during the past few weeks. They are now engaged on a large order to be shipped to New Zealand, and the factory is running at full capacity. Not long since a large order was sent to Honolulu, and for years large shipments have been made to Australia.

Miscellaneous.

The Youngstown Car Mfg. Company, of Youngstown, Ohio, are filling a large order for cars for the H. C. Frick Coke Company, of Pittsburgh.

The Pennsylvania Railroad Company have placed orders for 1500 additional box cars. Seven hundred of the new cars are to be built at the company's shops at Altoona, and contracts for the construction of the remaining 800 have been divided between the following car works: Murray, Dougal & Co., Limited, Milton, Pa.; the Jackson & Woodin Mfg. Company, Berwick, Pa.; the Carlisle Mfg. Company, Carlisle, Pa.; the Lebanon Mfg. Company, Lebanon, Pa.; Pardee, Snyder & Co., Watertown, Pa. The contract for this new equipment was divided on account of the immediate necessity for the use of the cars, and they will be built as quickly as possible. The orders for the iron materials to be used in their construction were placed almost as soon as the contracts were secured.

The following companies have been incorporated in Illinois: The Lansberg Brake Company, at Chicago; capital, \$2,000,000; for the manufacture of air brakes; incorporators, Henry Heil, Frank Lansberg and G. W. Pfeiffer. The Sharpneck Journal Mfg. Company, at Chicago; capital, \$1,200,000; for the manufacture of journal-boxes; incorporators, S. A. Stevens, Legrand Smith and Pliny B. Smith.

Fred. H. Holton & Co., of Cambridgeport, Mass., have built a copper rolling mill, which is now in operation. They will run it principally to supply their own wants. They use about \$200,000 worth of sheet copper annually in the manufacture of bathtubs, copper boilers and sheet-metal work.

The Newburg Iron Ship Building Company have sold the entire plant of the company to the Chesapeake Dry Dock and Construction Company, of Newport News, Va. The machinery will be transferred as soon as practicable. The Chesapeake company have the largest dry dock in the United States.

Volume IX of the Transactions of the American Society of Mechanical Engineers has just been issued. It gives the full pro-

ceedings of the Philadelphia and Nashville meetings during the past year, and, like the preceding numbers, is full of information of the greatest interest and value to engineers generally.

Natural Gas in China.

Consul Denby sends to the State Department, from Peking, an abstract of an account given by Baron von Richtofen, of natural gas wells in China. These wells are found in Sz'chwan, near a town called Tsi-lin-tsing. In an area of 27 li (9 miles) diameter salt wells are found. To make a well the Chinese use a long and elastic bamboo pole, supported in the middle by a cross piece, a rope made by coupling the ends of long (not twisted) slices of bamboo, and an iron instrument which weighs 120 catties (catty = $1\frac{1}{4}$ pounds). The rope is fastened on the thin end of the pole, and the iron on the end of the rope. A slight up and down motion of the thick end of the pole makes the iron hop and bore a vertical hole with its broad, sharpened edge. The ground to be perforated consists chiefly of sandstone and clay. When a portion of the rock is mashed, clear water is poured into the hole, a long bamboo tube with a valve in the bottom is lowered, and the turbid water raised to the top. Pipes of cypress wood are rammed in to protect the sides of the bored hole and to prevent the water contained in the surrounding ground from getting access to the well; the pipes are attached to each other at the ends with nails, hemp and tung oil. The inner width of the pipes is about 5 inches. As the work proceeds the pipes are rammed deeper, and a new one attached on the top; the rope, too, is made longer. At a depth varying from 70 to 100 chang (700 to 1000 feet) the brine is struck, and the well is fit for use. The brine is raised to the top through long bamboo tubes and bamboo ropes, as described, by means of a horse-whim, and then carried to large pans for evaporation, or led to them through bamboo pipes. Beside these wells there are others, which are bored to the depth of from 1800 to 2000 feet. At that distance below the surface petroleum is struck. Immediately on reaching it an inflammatory gas escapes with great violence. Work is now stopped, and a wooden cap fastened over the mouth of the pit, perforated by several rows of round holes. In each of them a bamboo pipe is inserted, and through these the gas is led under the evaporation pans. The pipes ramify, and on each end a tapering mouthpiece, terminating in a small aperture, is attached. The gas is then used for evaporating the brine.

The enterprising spirit which induced the Chinese to examine the ground at so great a depth is said to have had its origin in the drying up of a brine pit. The proprietor was in hopes of meeting brine at a greater depth, but found instead the gas. When the country was infested with rebels during the Taiping rebellion they removed the cap from one of the gas pits and set fire to it. Since that time, or at least up to the time that Baron Richtofen wrote, a long column of fire rose from that pit, and it is considered nearly impossible to stop the flame.

The gas pits and brine pits are owned separately by corporations. The owners are subjected to the control of the Government. The Government monopoly is in the hands of the "Taotai," who resides at the place. The salt works of Tsi-lin-tsing yield considerable revenue to the Government, and have, besides, enriched numerous proprietors, and given occupation to a numerous population. The number of "fire pits" is 24, and the salt pits are innumerable. Some of them do not enjoy the advantages of gas. The brine is evap-

orated with grass and wood. There are salt pits in neighboring localities on the Min River, but no gas pits.

History of the Gas Engine.

Sir Frederick Bramwell, in his recent address before the British Association for the Advancement of Science, remarked:

The gas engine is no new thing. As long ago as 1807 a M. de Rivas proposed its use for driving a carriage on ordinary roads. For anything I know, he may not have been the first proposer. It need hardly be said that in those days he had no illuminating gas to resort to, and he proposed to employ hydrogen. A few years later a writer in *Nicholson's Journal*, in an article on "Flying Machines," having given the correct statement that all that is needed to make a successful machine of this description is to find a sufficiently light motor, suggests that the direction in which this may be sought is the employment of illuminating gas, to operate by its explosion on the piston of an engine. The idea of the gas engine was revived, and formed the subject of a patent by Barnett in the year 1838. It is true this gentleman did not know very much about the subject, and that he suggested many things which, if carried out, would have resulted in the production of an engine which could not have worked; but he had an alternative proposition which would have worked. Again, in the year 1861, the matter was revived by Lenoir, and in the year 1865 by Hugon, both French inventors. Their engines obtained some considerable amount of success and notoriety, and many of them were made and used; but in the majority of cases they were discarded as wasteful and uncertain. The Institution of Civil Engineers, for example, erected a Lenoir in the year 1868, to work the ventilating fan, but after a short time they were compelled to abandon it and to substitute a hydraulic engine.

A Peculiar Industry.—Under the above head, a current paragraph gives the following particulars of the product of the castor bean: "The oil is specially adapted for lubricating all sorts of machinery, clocks, watches, &c.; and it is an excellent lamp oil, giving a white light far superior to that of mineral oils, petroleum, rapeseed, linseed and all other oils, whether vegetable, animal or mineral; it also gives very little soot, and, all things considered, has been pronounced the cheapest oil known. All the great perfumers of London and Paris use castor oil for the manufacture of golden oil, so well known for its property of keeping the head cool, and the skin and its pores, as well as the roots of the hair, soft and open. The oil is used for textile fabrics, to fit them for dyeing or printing, for which purpose the India dyers and printers invariably employ it; and it is one of the best oils for dressing tanned hides and skins of all kinds, on account of its imparting to them such a degree of strength, durability, tenacity and beauty. From the oil cake, in addition to its other uses, a gas is obtained, which gives a superior light, some of the stations on the East India Railway being illuminated in this way. The oil dissolves completely in alcohol, and this, incorporated with a solution of copal, makes a varnish which, it is said, is very useful in polishing all kinds of first-class furniture, carriages, picture frames, cloths, canvas, &c."

A branch railroad has been completed from the Milwaukee and Northern Railroad to the iron-ore mines of the Groveland Iron Mining Company, on the Menominee range, Michigan, and the shipments of ore to blast furnaces began last week. The company will mine Bessemer ores.

The Iron Age

New York, Thursday, October 18, 1888.

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The Steel Rail Trust.

The persistency of error and misrepresentation, not to use a stronger term, is strikingly illustrated by the frequent repetition of Mr. Scott's alleged figures of cost of steel rails at the Edgar Thomson works. We have shown their shortcomings in the past and have published the correct data, which were given out through Mr. Randall, but the numerous letters which have reached us since then prove that the latter have been overlooked, and emphasize the necessity of placing both side by side, although the items are not strictly comparable:

	Scott's estimate.	True cost
Pig iron.....	\$21.08	\$19.83
Spiegeleisen and ferromanganese.....	omitted.	3.24
Labor.....	4.09	4.32
Ingot molds, fire-brick, fire-clay, coke, oil, maintenance 1.2 tons Connellsville coke at \$1.35.....	not stated.	3.20
	1.62	...
Total.....	\$26.79	\$30.59
Deduct 25 lbs. steel scrap.....	...	2.18
Total.....	\$26.79	\$28.41

The Scott estimate took Bessemer pig at \$18, and added 13 per cent. waste from first to last on \$26, making it \$3.08. The actual cost figures were based on \$17 for Bessemer pig, allowing a yield of 85.8 per cent., and making a deduction for steel scrap. Mr. Scott made the stupendous blunder of assuming that it required 1.2 tons of Connellsville coke to produce a ton of rails at Edgar Thomson. Now, that establishment employs the direct process—in other words, the pig iron is taken direct in a molten condition from the blast furnaces to the Bessemer converters. No coke is used for remelting, except, possibly, in the case of accident, and for remelting the spiegel. The omission by Mr. Scott of the latter item is another astonishing error, to which must be added the neglect to provide for such sources of expenditure like molds, fire-brick, clay, &c.

To any one familiar with the manufacture of steel rails Mr. Scott's cost figures are ridiculously absurd on their face. Then it must be considered, too, that the Edgar Thomson Works are especially favored because they can use natural gas for raising steam and reheating, and because they are undoubtedly one of the best equipped works mechanically. It should be stated, too, that the cost figures give makers no allowance for the loss of revenue due to the production of seconds. It may be urged, on the other hand, that it does not cost the Edgar Thomson Steel Works \$17 to produce a ton of pig iron. Probably it does not, but the furnace plant is an independent department and charges the steel works with the market price.

Now, when it is considered that the Edgar Thomson steel plant ranks as one of the latest among the most efficient works of the world, and that even for it prices are now down to cost, the wildness of the state-

ments concerning the alleged steel-rail trust is clearly demonstrated. We have fully and frankly reported the facts concerning the Steel Rail Association. There may have been some among the manufacturers even who once attributed the rise following its creation to its existence. The different members of the association have had a very different conception of its aims and its power. Some have hoped and have urged that it be used to exercise a direct influence upon prices. Others have treated it as a means of impressing buyers with a show of power which it did not confer. Some have ostentatiously proclaimed their obedience to the dictates of the Board of Control in the matter of allotment; others have quietly sold all the rails they could get orders for with little reference to what had been assigned to them.

From his standpoint a railmaker who cannot crowd his cost below \$32 at mill may well bitterly ask what good there is in an association which cannot, or will not, stop prices from dropping to \$28 or less. When the demand in 1887 was heavy enough to give full employment not only to every mill in the association but to outsiders rolling from domestic or imported blooms, then prices rose to a level remunerative to all. When the inquiry dropped off values fell, so that a number of mills had to stop temporarily or entirely. Would a well-managed trust allow competition to degenerate in such a way, if it had the power to hold the price, even at the cost of paying a bonus to the weaker concerns? If the "trust" were as despotic as it is made to appear, would there be any sense in letting prices fall anywhere from \$5 to \$12 a ton below the cost of importing foreign rails? If the association criminally ran up prices to \$40, was it not stupidly generous, from the standpoint of the stockholders in the mills, in letting them drop off to \$28?

The rise went beyond the limits which some of the mills desired it to reach. We are informed that one of the makers proposed to the others to set aside a certain proportion of the product to keep English rails out of the Southwest and the Pacific Coast. It could not be done. The association was as powerless to control the advance as it was unable to check the decline. With all the alleged "trust" there is as much keen rivalry and sharp competition as there is among newspapers.

It may be urged that if our statement of the effect of the existence of the association is correct, it is a useless institution which the rail-makers might as well abandon. Yet they believe that it has done them some good. It collects monthly reports of sales and of shipments which are valuable to the majority of the mills. It has afforded the opportunity for at least one general meeting annually, at which the situation of the trade is discussed. It has afforded opportunities for mutual explanations and an interchange of ideas, the value of which business men in many lines of industry are more and more appreciating. We do not wish to be understood as denying that, early in the history of the association, hopes of a greater field of usefulness were entertained, probably, by the majority. Such illusions have been dispelled by the decline, but they do explain the apparently contradictory character of the reports during its history.

The Charcoal Furnaces October 1st.

A delay natural with so scattered an industry as the charcoal-iron manufacture made it impossible to present a report relating to them with the figures presented in our last issue. As will be observed from the details printed below, the charcoal furnaces are participating in the movement, now becoming so general, toward a larger output. Reports from a number of our correspondents show an active demand and a drawing upon accumulated stocks.

Charcoal Furnaces in Blast October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	8	605	6	495
New York.....	10	3	391	7	580
Pennsylvania.....	23	4	350	19	724
Maryland.....	13	3	271	10	570
Virginia.....	23	6	281	17	710
West Virginia.....	3	0	0	3	165
Ohio.....	18	8	580	10	865
Kentucky.....	3	3	270	0	0
North Carolina.....	2	1	90	1	80
Tennessee.....	9	5	1,020	4	980
Georgia.....	2	0	0	2	114
Alabama.....	10	8	1,531	2	370
Michigan.....	25	13	3,631	12	2,110
Minnesota.....	1	0	0	1	190
Missouri.....	4	2	595	2	320
Wisconsin.....	11	4	1,298	7	770
Texas.....	1	1	178	0	0
California.....	1	0	0	1	280
Washington Ter.....	1	1	380	0	0
Oregon.....	1	1	270	0	0
Total Oct. 1.....	175	71	11,619	104	9,088
Total Sept. 1.....	178	87	11,243	109	10,004
Total Aug. 1.....	178	85	11,137	111	10,065

In New York Chatham blew in in September, and Copake is probably at work at this writing. In Maryland two Stickney and one of the Maryland furnaces are producing iron. In Virginia Beverly, Cave Hill, Pierce, Reed Island, Speedwell and Walton made together 989 tons of iron in September. In Michigan reports from every active furnace show a total output of 16,171 gross tons for last month, Spring Lake having been added to the list; Detroit has followed since, and Elk Rapids is to blow in this month. In Wisconsin Hinkle, Florence, Minneapolis and National produced together 5571 tons; Missouri with two furnaces in blast made 2350 tons; Tennessee, with five stacks, 5195 tons, and Alabama, with eight furnaces, produced 6561 tons. Bear Spring is now being run in Tennessee to work up an old stock of coal, and will make 1400 or 1500 tons of warm blast car-wheel metal. The Nashville furnace is running on coke. In Alabama Ironaton is out; Round Mountain product was reduced by labor troubles, and one Woodstock was out two weeks repairing. The tendency is toward a larger output of charcoal iron.

A Chicago pig iron manufacturer informs us that while he agrees with the statements of fact set forth in our article of last week on the Chicago coke pig iron trade, he desires to lay particular stress on the increase in productive capacity in the blast furnaces in that locality, which enables them to fully supply the local demand and will probably allow for some growth in it. He calls attention to the fact that not only are blast furnaces now in operation which formerly stood idle for months and even years, but those in course of repair are being equipped with new hot-blast stoves and other appliances intended to largely add to their output when they

are again blown in. The hold on the home trade, which has for the first time been thoroughly established this year, the home manufacturers expect to maintain, the conditions now being deemed permanently favorable for the assemblage of raw materials at Chicago at sufficiently low cost to meet the competition of manufacturers in other sections. By the control of the home trade the entire exclusion of other irons is not meant, because consumers of pig iron often have preferences for brands which they will not relinquish until there is a decided difference in price. But the general consumers, who buy at the lowest price, quality considered, are those whose trade is secured, and they are the mainstay of the market.

Steel Makers in a False Position.

Sensational disclosures have been made in a bill filed in the United States Circuit Court at Chicago by the Atkinson Car Spring Works, of that city. An injunction is asked against the American Railway Spring Company, the American Steel Association and Park, Bro. & Co., Limited, to restrain them from making unjust discriminations against the complainants to ruin their business. The statement is made that in 1887 the American Railway Spring-Makers' Association was formed to protect the interests of the manufacturers and to regulate the price of car springs. The Atkinson Car Spring Works joined this association. In March of the present year the members of the association organized a trust called the American Railway Spring Company, in which each spring manufacturer was awarded stock. Allotments of business were made according to the capacity of the several works, and out of the sales they were to pay 2 per cent. to the trust. If the business done by a member exceeded the amount he was allotted he was obliged to pay the trust 15 per cent. of such sales. A fund was thus to be created, out of which the expenses of the trust were to be paid, and a part of it was to be divided among the members whose sales should fall short of their allotment.

When the Atkinson Car Spring Works applied for membership in the trust they were allotted less than half their capacity. In the ordinary course of business, this would have compelled them to pay the trust a tax of 15 per cent. on the greater portion of their sales. A further condition of admission to membership sought to be imposed was that the applicants should exhibit to the secretary of the trust all of their contracts. They refused to make this disclosure as to their private business, and demanded a larger allotment, the result of which was that they did not join the trust. They allege in their bill that the trust, in order to drive them out of business and control the car-spring trade, set aside a fund to be used against them, so that when the Atkinson Car Spring Works made a bid on a spring contract a member of the trust would bid below cost and take the business, being reimbursed for his loss out of the fund.

Now comes the part enacted by the steel manufacturers who supply the steel to the spring-makers. It is claimed [that the spring trust made an arrangement with

the American Steel Association, which is composed largely of the manufacturers of spring steel, to have the Atkinson Car Spring Works charged \$10 per ton more for steel than the members of the trust. The American Steel Association is not a trust, but merely a trade organization, yet its members seem to have acquiesced in the wishes of the spring trust and to have taken action binding themselves to sustain it. The Atkinson Car Spring Works purchased steel of Park, Bro. & Co., and were charged \$10 per ton more than their competitors, who are members of the spring trust. Notes were given in payment for the steel, and the court is now asked to restrain Park, Bro. & Co. from collecting more than its market value, as well as to enjoin the trust from its objectionable practices in attempting to destroy the business of the complainants.

At first blush it seems almost incomprehensible that the manufacturers of steel would lend themselves to such an outrage as the car-spring trust has sought to perpetrate, and we do not believe they were fully conversant with the facts in the case at the time when they agreed to charge independent spring manufacturers \$10 per ton more than the members of the spring trust. The steel manufacturers should at once repudiate such an agreement, which is now made odious by the knowledge that it was to be used as a most powerful influence in destroying opposition to the spring trust. While the members of the trust were willing, wherever they could make a competing bid, to furnish springs below cost to keep the Atkinson Car Spring Works from securing business there was still a little chance of the latter keeping alive on work quietly obtained, but that chance was obliterated when the price of steel was so arbitrarily advanced.

It should be mentioned in justice to all interests that besides the Atkinson Car Spring Works another firm of spring manufacturers have steadily refused to join the trust. This firm is Miller, Metcalf & Parkin, of Pittsburgh. The peculiar tactics of the trust could not be used against them, however, as they manufacture their own steel.

A movement is on foot which is receiving considerable encouragement, to hold a meeting of American engineering societies abroad next year. The civil engineers, the mining engineers and the mechanical engineers have been approached and it is likely that after the ground has been sounded the enterprise will come up officially before the societies. We understand that there is a prospect of a cordial reception, providing for a week's stay at London, then a chance to attend the Paris meeting of the Iron and Steel Institute, and a week later a joint meeting of the English, French and American mechanical societies. The opportunities afforded for visiting the Paris Exhibition under peculiarly favorable auspices would probably not be lost sight of as an additional attraction. We understand that one of the steamship companies will undertake to run an extra steamer for the outward trip at special rates, providing the number of participants is over 150, the engineers being given the privilege to use their tickets for the return at any time during three months.

The Frauds at the Washington and Croton Aqueducts.

It is not surprising that irregularities, to use a mild expression, have been detected in the execution of the contracts for the two new great aqueducts which are to furnish water to the cities of New York and Washington. The term public works has become so nearly synonymous with corruption and fraud that the revelations, in connection with the Croton aqueduct at least, were almost expected, notwithstanding the fact that some attention had been given to the organization of what ought to have been an efficient staff of inspectors. We give to the Croton aqueduct the distinction of being the more likely of the two to warrant suspicion of fraudulent performances, mainly because of its New York connection, which speaks volumes for itself and which stamps nearly every public undertaking as a source of illegitimate profits to those immediately connected with its practical execution. Besides this, the Washington work was in the hands of Government engineers, of whom it was only natural to suppose that they would discharge their duties most conscientiously.

Details of the scandals which have lately been unearthed show that the shortcomings in the work are about the same in both cases, the lining of the tunnels and its backing being defective to a degree which almost surpasses belief. In the Croton aqueduct the most common form of bad work was in the backing, which, in a large number of places, consisted of dry stone packing, dumped in promiscuously and which consequently had open spaces of varying dimensions, according to the size of the stone used. Then, again, it was found that no attempt whatever had been made to fill long stretches over the arch of the lining. One particular hole was about 50 feet long on the axis of the tunnel and limited only at the ends by the roof coming too low down to permit further progress. A favorite material for filling some of the spaces appears to have been found in the empty cement barrels, over 800 of which were discovered on one division alone stowed away where there should have been solid rubble masonry. All this filling, however, as well as the empty spaces, was estimated and paid for as so much masonry at \$6 per cubic yard. The profitable character of this work to the contractors requires no comment. Of the lining itself only the first or sometimes the second ring was properly laid, many of the bricks in the others being readily removed by hand.

In the Washington aqueduct a large part of the lining is reported worse than useless, and will be pulled down and rebuilt. The backing also has been found conspicuously absent in many places, and in others consists of loose stone tumbled in without cement, the whole paid for, as in the New York work, as solid masonry. The War Department, we understand, has referred the whole matter to Major Lydecker, the engineer of the Department, for investigation and report. The responsibility in both cases can, we think, be fixed with very little difficulty. While all directly connected must bear a portion of the blame, the principal burden falls upon the engineers and contractors who were primarily charged with the faithful supervision and execution of the work.

The Light Sheet Iron Trade.

In some portions of the country, particularly in the West, a positive famine has been raging in light sheets. For weeks the demand has been so great that no stocks can be accumulated in the hands of the leading distributors at trade centers to meet the demands of the small consumers. Orders are booked in advance of receipts, which keep the stock moving from the receiving department to the shipping-room. The mills are being pressed for deliveries in advance of dates agreed upon when contracts were made, but they so anticipated their entire output that they have allowed no margin for such a condition of affairs. The work they now have in hand will keep them busy much beyond the usual active season, while some manufacturers believe they will be able to run full time until next summer.

Allusion has been made in our market reports to some of the causes of this activity in light sheets. One of the main reasons assigned, and probably the only one which has been far-reaching in its influence, is the rapid growth of the iron roofing trade. While this branch of business has shown a steady advance for years past, it has made remarkable progress this season. Careful observers estimate the consumption of sheet iron for roofing, siding, ceilings, shutters, &c., in 1888 at fully 25 per cent. above that of 1887. Numerous establishments are working up 33½ per cent. more sheet iron this year than last, some have made gains of 50 per cent., and it is stated that one concern will probably reach 60 per cent. A large part of the increased use of iron roofing has taken place in the East, whereas in previous years the West was peculiarly the home of iron roofers. This is explained by the growing favor with which iron roofing and siding are being received by owners of manufacturing establishments. Corrugated iron buildings are being erected instead of more expensive brick and stone structures. Increased room for warehousing goods is thus obtained at lower cost and with fully as great protection from fires originating outside as though brick and stone were used. Sheds, stables, depot sheds, awnings for stores and a variety of other uses in the same line calling for light and strong roofing have stimulated the consumption of sheet iron most remarkably. More iron than ever before is going into shutters, doors and other methods of protection against fire, while sheet-iron ceilings are steadily growing in favor for decorative purposes. The galvanized-iron cornice-makers constitute in themselves an important subdivision of the roofing trade, and they consume an increasing portion of the output of the sheet mills.

The gauges of sheet iron used for roofing run from No. 24 to No. 27, a favorite thickness being No. 26. These numbers being in greatest demand by the stove and stovepipe makers and manufacturers of kitchen utensils, the competition for stock between them and the roofers will be readily understood. In making shed roofs of corrugated galvanized iron heavier gauges are used, running down to No. 22. In such cases the joints are soldered instead of being standing-seamed, roofers finding iron heavier than No. 24 too stiff to make

a good joint of the latter character. The demand for light sheets growing out of the great development of the iron-roofing trade will keep up well into the winter, and promises to be renewed with even greater vigor next spring if the present prosperity of the country continues. This will be very satisfactory to the manufacturers of sheet iron who will find the demand for their product assuming more of a perennial character, although it must be admitted that this change has been gradually taking place in the past year or two. It is not a sudden development, but its effects on the trade were not marked until they produced the scarcity of stock which is now being felt. An obvious lesson to be learned from the experience of this fall is, that the general distributing and consuming trade must hereafter get their orders in early if they would have plain sailing in their busy season.

The Position of Tin Plates.

Since we last wrote editorially on the position of tin plates, two months ago, the New York market has been very active; the demand for canning purposes during the interval having proved all that was expected, especially for coke tin, which for a time could not be procured in amounts sufficient to cover requirements, and while this was the case temporarily advanced considerably. Now that the most active season is over, there is a lull; besides, the productive capacity of Wales is now evidently gaining on consumption, hence the partial reaction here coincides with receding prices on the other side. As tin plates are, however, comparatively cheap at current rates, it is not believed that there is much chance of a further decline, if any. This country has absorbed the largely increased importations with such remarkable ease that confidence in the future of the article has been greatly strengthened.

The import into the United States during the first eight months has been as follows:

Imports of Tin Plates.

	1888. Pounds.	1887. Pounds.
Imports.....	456,109,658	431,223,021
Re-export.....	664,596	1,009,661
Net import.....	454,445,062	430,213,360
Import gross tons.....	202,877	192,062

The increase amounts to 10,815 tons, or nearly 6 per cent. The English Board of Trade returns for tin plates for the first eight months show the following amounts and distribution:

	1886. Tons.	1887. Tons.	1888. Tons.
To France.....	2,912	3,572	3,148
the United States.....	186,460	179,296	196,388
Canada.....	9,245	13,389	14,209
Australia.....	2,558	3,992	5,523
Other countries.....	31,563	35,702	44,294
Totals.....	232,738	235,901	263,562

If we except France, there is an increase in all directions.

The average price of coke tin has been:

1886.	1887.	1888.
13/2¼	12/10	13/0¼

If the advance in tin since June had been reflected in the price of plates to a much greater extent than has been the case, it is doubtful whether such large amounts of the latter could have been pushed off.

In September, prior to the present reaction, the demand continued in England on a large scale. Makers were at the

time so well supplied with orders that for the moment they seem to have felt quite independent, basing their arguments on the fact of iron being firmer and an advance in steel bars being contemplated, coal had advanced in price, and tin was again dearer, stocks of tin plates besides showing a decrease for the month of 36,000 boxes. As we approach the duller winter months, a pause in the more active demand for plates may be somewhat prolonged. Still they may prove good property to hold in view of the moderate ruling figures, and the encouraging general business prospects for the coming spring. The general impression is that next year, unless something unforeseen of an unfavorable kind happens, will be prosperous, all elements underlying the general situation pointing that way. A better insight in this respect will be afforded us after the elections, when a new leaf may be turned with greater safety. Meanwhile tin plates, in common with most other commodities not swayed by purely speculative influences, will have to pass through a short period of quietness.

OBITUARY.

ABRAHAM K. LISSBERGER.

Abraham K. Lissberger, aged 57, who was for many years a manufacturer of lead pipe in Boston and this city, died on the 11th inst. at a private hotel at Sixty-third street and Lexington avenue. He spent the greater part of his life in Boston, and in 1880 came to this city and until about a year ago was a general metal manufacturer at No. 256 Pearl street. At that time he became a sufferer from rheumatism and Bright's disease. Relinquishing all business pursuits, he went to Mount Pleasant, Mich., and afterward to Bedford Springs, Pa., with the hope of obtaining some relief. Believing himself to be materially improved in health, he returned to this city in September. A relapse ensued, and he grew steadily worse until the time of his death. Mr. Lissberger leaves a wife and three daughters.

The pioneer steamer of a new Canadian line of steamers, to trade between Charlottetown, Halifax and Boston, was completed a short time ago on the Clyde, Scotland. The Halifax, the name by which the vessel is known, is 250 x 35 x 23 feet, molded, with a tonnage of about 1600 tons. The engines of the vessel are of the triple-expansion type, the cylinders being 30 inches, 48 inches and 73 inches in diameter, with a 48-inch stroke of piston. The indicated horse-power is 3000. Steam is supplied by two steel boilers 14 feet in diameter by 17 feet 3 inches long. The grate surface is 246 square feet and the heating surface 6054 square feet. Boilers worked on trial at a pressure of 160 pounds per square inch, and the engines developed 3100 horse-power. The vessel, when tried on the measured mile, developed a speed of 15½ knots.

Eight of the new vessels of the navy are now afloat—the Dolphin, Atlanta, Boston, Chicago, Yorktown, Vesuvius, Charleston and Baltimore. Only two, however, the Dolphin and Boston, are in condition for service.

Top Mill Furnace, owned and operated by the Wheeling Iron and Nail Company, at Wheeling, W. Va., which has been undergoing repairs for some time, will blow in during the present week.

THE MECHANICAL ENGINEERS'

SCRANTON MEETING.

The ninth annual meeting of the American Society of Mechanical Engineers, at Scranton, Pa., began on Monday evening last, the opening session being held at the hall of the Young Men's Christian Association. In the absence of Mr. Horace See, the president, due to illness, there was no annual address, Mr. C. J. H. Woodbury presiding. The meeting was opened by an address of welcome delivered by Col. J. A. Price, President of the Scranton Board of Trade, in which, among other things, reference was made to the manufacturing wealth of Pennsylvania, with special regard to Scranton and its vicinity, and to the exhibition to be held at Scranton next year. This, in the words of Colonel Price, will be an exhibition of concentrated power of which great things are expected. Mr. Woodbury, after having responded to the cordial welcome extended by the city of Scranton, called upon Prof. R. H. Thurston, who presented two papers on closely related subjects. The first was on

THE DISTRIBUTION OF INTERNAL FRICTION OF ENGINES.

was then taken up. It having been found that the internal friction of an engine is invariable in any important degree with variation of power, it became an interesting and important problem to determine just how this engine friction is distributed among the various moving parts, journals, guides, stuffing boxes and piston rings. The experiments which were made for this purpose were carried out by Messrs. Carpenter and Preston with a number of different forms of engines. They were described and the results given, together with conclusions, in Professor Thurston's paper. The plan adopted was to first determine the friction of the machine in the manner already practiced by them and by their predecessors in this work, then to dismantle the engine, part by part, driving the connected parts by a pulley and belt from the main line of shafting overhead, through a transmitting dynamometer carefully standardized, and thus to secure measurements of the resistance of part after part until all the rubbing parts having been thus examined, the sum of their resistance at the normal speed of the engine should give the total internal friction of the engine and the percentages of the whole due to the resistances of each point of connection or rubbing. In each experiment the endeavor was made to secure precisely the conditions of operation, so far as was practicable, which were usual in its regular working. For instance, the engine was always heated up by its own steam when the resistances of the piston and the valves were to be measured; the speed of engine was kept the same when testing the friction of journals as when it was doing its full work; the valve, balanced and unbalanced, was tested under the usual boiler pressures, as well as unloaded, and exactly as possible, and thus every precaution that could be devised was adopted to secure precisely the results that should be observed, were such observation possible, when the machine was at work. The engine was first driven by the shafting, and through the dynamometer, with everything connected and the cylinder heated up to its usual temperature by a run, immediately preceding, under steam, the cylinder heads and steam chest cover only being removed to prevent any pump-like action of the engine while so driven. Next, the piston was disconnected, and the power demanded to give the engine its regular speed was observed with all other parts

connected and moving, thus obtaining a measure of the friction of the piston alone by differences. Then the next point of connection would be broken, and another observation would give the friction of the next successive piece, and so on until the whole engine had been gone over, when the machine was assembled again, part by part, and thus a check obtained on the previous determinations.

The other paper by Professor Thurston was entitled "Variable Load, Internal Friction and Engine Speed and Work." In this results were given of an extended series of trials made with various engines under different speeds and loads, with a view of determining the variations of the internal resistances of the engines under the imposed conditions.

Bearing directly upon some of the points involved in both these papers was a paper by Mr. T. E. Denton, which was accordingly presented also before opening any discussion. It was entitled "The Friction of Piston Packing Rings in Steam Cylinders." The description of the apparatus used for measuring this friction and a reference to the diagrams obtained by its use will be found in another column.

Mr. Denton in opening the discussion referred to the effect of water lubrication in steam cylinders and to experiments made by him which showed that between the speeds of 36 and 150 revolutions per minute no appreciable difference in the piston friction of the particular engine under trial could be observed. Mr. Woodbury briefly spoke of the use of pumps for supplying oil to journals, and also of the excessive friction in some steam pumps, due to screwing down the piston rod glands too tightly. A pump which had come under his observation, and in which the area of the steam cylinder was more than four times that of the water cylinder, was totally inoperative from this cause. Mr. Denton, in referring to the fact that with increased loads there was no increase in the friction of an engine, asked for an explanation, and offered it as his view that the various journals exerted a pump action which drew in the lubricant between the bearing surfaces. This pump action, he thought, became more vigorous as the energy transmitted through the various journals was increased. As an illustration of it he exhibited a plug which had been ground to fit a ring within the $\frac{3}{8}$ part of an inch. This plug if lubricated and inserted in the ring could be easily slid back and forth, providing it was kept going constantly, but the instant it was stopped it would stick. M. Geo. Schuhmann criticised the device designed by Mr. Denton for determining packing-ring friction, saying that it did not represent practical conditions, owing to the presence of steam-tight rings both above and below the ring of which the friction is measured. The steam acting on the outside of the ring did, in his opinion, exert an important influence upon its friction. Mr. W. F. Durfee drew attention to the effect of cylinder condensation on piston friction. In vertical engines, he said, the water of condensation was evenly distributed over the upper surface of the piston, and aided appreciably in lubricating the piston; while in horizontal engines the water, of necessity, accumulated on the lower side of the cylinder, and lubricated only that particular part. This Mr. Durfee considered an important feature in favor of vertical engines, several of which he had known to run satisfactorily for years without any lubricating oils whatever in the cylinders. Mr. Thos. S. Crane remarked that engines had been run without cylinder oils more than 30 years ago with thoroughly satisfactory results. Mr. J. F. Holloway suggested that the use of different kinds of piston packing rings might in a measure explain the varying degrees of piston fric-

tion. As directly opposed to the notion that water of condensation was an important aid to cylinder lubrication, Mr. W. E. Crane cited a case where an uncovered steam pipe supplied steam, presumably somewhat wet, to an engine. Serious difficulty with excessive friction was experienced until the pipe was covered with a non-conductor. The trouble then vanished immediately. This was found to be the case on several occasions when it was necessary to make alterations in the pipe arrangements, the supply pipe at these times being left temporarily uncovered. As regards the pump action of journals Professor Thurston thought that, where the latter were loose, such action might be very effective. He referred, also, to the influence of distorted journals, where the latter were not stiff enough to resist springing, and cited the case of the United States ironclad Dictator during the war, the shaft of which gave so much trouble from this cause that it was impossible to run the engines up to full power. Mr. Denton expressed his confidence that an engine would run fairly well without cylinder lubrication, and without danger of cutting, but he held it to be a mistake to suppose that there was no increase in friction under such conditions. Experiments which he had made showed that the increase was very decided, and the reason that it was thought not to exist in some of the older engines which had been run without oil was probably due to the fact that there were no means of determining it. The different parts in such engines were so extremely strong and stiff that the vibrations, which would ordinarily result from greatly increased friction in weaker structures, were not perceptible. As an illustration, he brought up the case of a Buckeye engine, in which the increased friction, due to discontinuing the use of cylinder oil, caused a loud clanking noise, which again disappeared on introducing oil. He cited also the case of the reverse lever of a locomotive, which, when oil was used on the valve, could be easily held in position with one hand. Leaving off the oil, the friction became so great that it was impossible for two men to hold the lever back. Mr. Denton's remarks concluded the discussion.

The meeting was adjourned shortly after 10 o'clock.

Tuesday, October 16.

The morning session was opened at 10 o'clock. The report of the council was first presented, and directed attention among other things to the invitation extended by the British Institution of Mechanical Engineers to hold a joint meeting at London next year, and also to visit Paris, where a joint meeting with the British Iron and Steel Institute is in prospect. Messrs. Wiley and Hutton were appointed a committee to give the matter further consideration. Thirty new members, four associates, and seven juniors were elected, bringing the total membership of the society up to £03.

Reports were also presented by the secretary for the Library and Finance committees, the committees on Uniform Tests, Standard Flanges, and Uniformity of Duty Trials of Pumping Engines. Progress in the work of all these committees was reported, and the committees themselves were continued. The report of the tellers, which was then presented, showed that the following officers had been elected for the ensuing year: President, Herry R. Towne; vice-presidents, Wm. Kent, Thos. J. Borden, and C. B. Richards; managers, Geo. M. Bond, F. H. Ball and William Forsyth; treasurer, W. H. Wiley.

A resolution was then offered by Mr. James T. Boyd, aiming at the reduction of the number of meetings of the society to one every year. An animated discussion

ensued in which a large number of members took part, among them Messrs. Babcock, Durfee, Holloway, Trump, Lyne, and Professors Thurston, Hutton and Wood, all of whom strongly opposed the resolution. On motion the latter was laid upon the table. Secretary Hutton having made several announcements relative to excursions and other details of the meeting, the first paper of the session was presented by Mr. Charles T. Main. It was on

THE USE OF COMPOUND ENGINES FOR MANUFACTURING PURPOSES.

Mr. Main stated that if steam is to be used for power exclusively the compound engine of proper design, in its common form, is now admitted by nearly all to be the most economical, especially if considered simply with reference to the efficiency of the steam, without considering the efficiency of the mechanism and the increased cost of the plant over other types. If more or less low-pressure steam is required for other purposes than power, this type in a special form can be used to advantage except in such cases as require nearly or quite the same amount of low-pressure steam as would be exhausted from an engine producing the amount of power required. Such a condition as this might exist where small amounts of power and large amounts of low-pressure steam are required, as in a dyehouse or printery, or in case a portion of the power is produced from water and the other portion from steam, the power of the latter being such as to supply the required amount of exhaust steam for the various purposes to which it is put. In such cases as these it would be absurd to add a condensing cylinder to the engine, and then supply the low-pressure steam direct from the boilers through reducing-valves. The proper type to use here would be the simple high-pressure engine for ordinary pressure, say up to 100 pounds per square inch above the atmosphere. Between these two extremes, of steam used for power only and an amount of low-pressure steam used equivalent to the whole amount exhausted from the engine, lie nearly all the cases of ordinary practice. Mr. Main then proceeded to determine which type is proper to use if a certain proportion of the steam from the engine can be used for heating purposes.

The paper was discussed at some length, special attention being drawn to the comparative value of steam and water power for mill use by Professor Hutton, who referred to a mill at Holyoke, Mass., where water power, though available and abundant, was not used, and a steam plant was erected. Mr. Babcock remarked that in some mills it was cheaper to use steam plants because large quantities of steam were used for purposes other than power, such as heating and dyeing. Mr. Durfee referred to a French design by which a water-wheel was made to drive a friction device, the heat generated being employed to raise steam for a mill. Attention was directed by a number of the speakers to the unreliability of water powers, which explained in a great measure the preference given to steam. The calorific value of coal and its bearing upon some of the results given in Mr. Main's paper was also touched upon. The question as to why the competition of low-cost water powers did not drive out the higher-priced steam plants was explained by the difference in location. Thus the low cost of production of a water-power mill might be counterbalanced by the cost of transportation to a market, while steam power mills could be located at the most desirable points and the ultimate cost of their product thus maintained sufficiently low to admit of successful competition.

Mr. W. F. Mattes, of the Lackawanna Iron and Coal Company, then addressed

the meeting, and directed attention to some of the points of interest to be noted at the works of the company during the afternoon visit there.

Mr. C. H. Peabody followed with two papers, the first being entitled "Flow of Steam in a Tube," in which were given the results of experiments made in the mechanical engineering laboratory of the Massachusetts Institute of Technology. The results are of considerable interest on account of the lack of data bearing upon the subject, and together with the means by which they were obtained are referred to at greater length on another page.

Mr. C. H. Peabody next presented a description, together with results, of

A SIMPLE CALORIMETER,

which depends on the property that dry steam is superheated by wire drawing. The first calorimeter of this type was made as follows: A piece of pipe, 6 inches in diameter and 10 inches long, was capped at each end. In the upper end was fitted a $\frac{1}{4}$ -inch pipe, bringing the steam to be tested, a thermometer cup and a steam gauge. From the lower cap a 1-inch pipe led away the exhaust steam. The supply pipe brought steam from the main steam-pipe nearly overhead. Near the calorimeter was a T which formed a pocket, with a drip at the lower opening, and a branch from the side opening leading to an angle valve in the upper cap of the condenser. The pipe, further, was well wrapped with hair felt, and it was assumed that the steam had the same quality as in the main pipe. The calorimeter itself was wrapped in asbestos board and hair felt, and covered with Russia iron. Two other calorimeters have been made, which differ from the first only in size. One is made of a piece of 2-inch pipe, 8 inches long, and the other of a piece of 4-inch pipe of the same length. The only difference in the action of these three calorimeters appears to be that the smaller ones are more sensitive—i.e., they respond more quickly to any change of condition.

The papers were discussed at some length by Mr. Denton, this concluding the session.

The Afternoon.

as already intimated, was devoted to excursions in the city, nearly, if not all, the visitors going to the works of the Lackawanna Coal and Iron Company. We cannot here attempt to particularize all the features of interest presented, the magnitude of the establishment, moreover, permitting only a hurried inspection. Two new sets of blowing engines for the steel department were in course of erection, and attracted a good deal of attention. They were built by the Dickson Mfg. Company, of Scranton, are of the horizontal type, and have blowing and steam cylinders 54 and 50 inches in diameter, respectively, with 5-foot stroke. They were built according to designs by Mr. W. F. Mattes. Probably one of the most interesting features about the works is the utilization of waste coal. The fuel used under all the boilers consists of a mixture of culm and pea and buckwheat coal; the company have no market for these last, and hence dispose of these coals in that way. About 5000 tons per month are used, and the cheapness of the fuel explains what might otherwise appear to be a reckless disregard of all principles of economy in coal consumption. Rocking grates are used under the boilers, and an induced air-blast is led into each ash-pit. Thin fires are maintained so as to enable ready cleaning. The visitors, entering the blast-furnace blowing-engine houses, passed successively through the latter room, where the roll-turning is done, the rail mill, converter-house and other departments. An excursion was also made by a number to the Scranton electric-light station.

In the evening at 8.30 o'clock the society

was tendered a reception by the Scranton Board of Trade, at the rooms of the Young Men's Christian Association.

Wednesday, October 17.

The Wednesday morning session was called to order at 10 o'clock. After some remarks had been made by Mr. G. H. Babcock on the flow of steam, the meeting took up a contribution by Messrs. S. W. Powell and W. L. Cheney on

A SYSTEM OF WORM GEARING OF DIAMETRAL PITCH,

directed attention to the fact that there is generally confusion in the shops which use both circumferential and diametral pitches for spur and bevel gearing, as many do where patterns are on hand for gears with cast teeth of circumferential pitch, and where cut gearing is made of diametral pitch. This confusion causes an unnecessary waste of time and often consigns a good casting to the scrap heap. It could be avoided, the authors say, so far as spur and bevel gears are concerned, by making all such gears of diametral pitch, and by making worm gearing also of diametral pitch. What they propose is to cut the worm thread to a fractional pitch corresponding to one of the diametral pitches now in common use; make the tooth the same length in worm gearing as is now used in spur gearing of diametral pitch, and make no change as to clearance on the top and bottom of the thread, if there is any allowed. They propose to thread the worms by means of a pair of transforming gears put into the train of change gears of any ordinary lathe. Many small and medium-sized lathes are made with the change gears in line, and here some provision would have to be made for compounding. This can be done in a great number of cases with very little expense by making the larger of the transforming gears "dished," or with the rim offset outward, and also making a new intermediate stud long enough to take the smaller of the transforming gears together with the gear which would be put on the spindle in ordinary screw cutting. In this arrangement the larger transforming gear would be put on the spindle. Other arrangements will readily suggest themselves.

Some of the advantages which, according to the authors, would be gained by adopting this system for worm gearing are doing away with odd sixty-fourths and thousandths in the diameters of worm gears, and making their diameters come in even fractions; getting even figures in center distances between worm-gear shaft and worm-shaft or their bearings; doing away with considerable work in calculations in the drawing-room, in which there is always a chance for errors; and if in addition to using the diametral pitch and length of tooth we make the worm gears straight across the face, which, in most cases, seems to be practically as good as the more expensive way of making the points of the gear teeth follow the shape of the bottom of the worm-threads, the lathe man need not know whether the blank he was turning was to be a spur or worm gear.

A brief discussion by Mr. Crane led up to the next paper on "An Improved Method for Finding the Diameters of Cone and Step Pulleys," by Mr. C. A. Smith. The subject was divided into two parts, the first consisting of brief rules, for the practical man, for finding the correct diameters, and the second giving a history and analysis of the method.

Messrs. Sweet and Denton made some remarks, whereupon Prof. G. Lanza's paper on "The Strength of Cast Iron" was read. It contained a brief account of several sets of tests upon the strength and other resisting properties of cast iron, carried on in the Laboratory of Applied Mechanics of

the Massachusetts Institute of Technology, and recorded the results obtained. The subject thus brought up was dealt with by Messrs. Denton, Durfee and Barr.

Mr. J. E. Denton's paper on

THE IDENTIFICATION OF DRY STEAM

was then presented. The paper was divided into two parts, the first dealing with experiments with steam jets, and the second giving general expressions for the instrumental errors of condensing calorimeters for testing the quality of steam. Mr. Denton's conclusion from his investigations were that jets of steam show unmistakable change of appearance to the eye when steam varies less than 1 per cent. from the condition of saturation either in the direction of wetness or superheating. It appeared further from the investigations that the instrumental error of portable condensing calorimeters does not theoretically interfere with the measurement of about 1 per cent. of variation in the heat of saturated steam. But in the use of such calorimeters there has always been found to exist an accidental variation of error considerably in excess of the theoretical instrumental error, even Regnault's magnificent work not being an exception in this respect. Consequently if a jet of steam flows from a boiler into the atmosphere under circumstances such that very little loss of heat occurs through radiation, &c., and the jet be transparent close to the orifice, or be even a grayish-white color, the steam may be assumed to be so nearly dry that no portable condensing calorimeter will be capable of measuring the amount of water in steam. If the jet be strongly white, the amount of water may be roughly judged up to about 2 per cent., but beyond this a calorimeter only can determine the exact amount of moisture. A common brass pet cock may be used as an orifice, but it should, if possible, be set into the steam drum of the boiler and never be placed further away from the latter than 4 feet, and then only when the intermediate reservoir or pipe is well covered. The paper was discussed by Messrs. Emery, Peabody, Weightman, Babcock and Oberlin Smith.

An interesting paper on "The Cost of Power in Non-Condensing Steam Engines" was then presented by Charles E. Emery. To this we may have occasion to refer more at length in a future issue, and will, therefore, simply say at present that Mr. Emery supplied in it means of ascertaining the probable cost under all customary conditions by short and readily carried out calculations. Messrs. Denton, Barr and Wheelock spoke on the subject.

Prof. G. Lanza followed with a paper on "Counterbalancing the Action of the Reciprocating Parts of a Locomotive." In this an account was given of the experimental work that has been done in the Laboratory of Mechanical Engineering of the Massachusetts Institute of Technology in regard to the effect of different methods in use for counterbalancing the throw of the reciprocating parts of a locomotive. After a few remarks by Mr. Emery, a topical discussion closed the session.

THE AFTERNOON

was devoted to excursions to the works of the Dickson Mfg. Company, the Pine Brook Colliery, the Boies Steel Car Wheel Works and the works of the Suburban Elevated Railroad Company. In the evening another professional session was held, at which special attention was given to the discussion of "Steel Phenomena." To this we will refer again in our next issue.

To-morrow (Thursday) will be given up completely to an excursion. A special train will leave this morning for Hawley and Honesdale. After dining at the latter place the party will be conveyed by the gravity cars of the Delaware and Hudson

Company over the Moosic Mountain via the Shepherd's Crook to Carbondale, and thence by the D. and H. main line back to Scranton through the Upper Lackawanna coal field.

The meeting so far has been well attended and much interest has been manifested in the proceedings.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., October 16, 1888.

The first session of the Fiftieth Congress is in the last stages of parliamentary existence. In the House, there has been no quorum for several weeks. In the Senate, the debate on the tariff bill is dragging along wearily and slowly. The Senators, as a rule, tarry long enough to work off their speeches on the subject, when they leave for home to await the verdict of the people on the 6th of November. There has been no quorum of the Senate for some days. Senator Allison says that the bill will not be voted upon until next winter, and it never was supposed that it would be. Senator Aldrich, one of the Sub-Committee who prepared the bill, says that he will not speak on the subject until next session. Senator Jones, another member of the Sub-Committee, has gone to San Francisco. The fate of the Senate tariff bill will be dependent entirely upon the verdict of the people on the Presidential nominees. If General Harrison shall be elected, it will mean that the people indorse the Senate idea of tariff revision. If President Cleveland should be elected, it is not likely that any further effort will be made to bother about the bill.

In the same connection it would be no surprise if the Mills bill would get through the Senate, as the weak-kneed senators, with the vote of the people before their eyes, might find ample reason to support a bill, which, on issue as it now stands, received popular endorsement.

There is no doubt that the election three weeks hence will have a decisive effect in determining the economic policy of the country in the direction of protection or free trade for some years. The discovery of the error in regard to coal in the Senate tariff bill has raised a decided commotion in political and industrial circles. Representative McComas, of the Cumberland District of Maryland, has been here and had a conference with Senator Allison. It appears that the item was inserted at the suggestion of the New England senators, but was intended to read Coal-Slack or Culm, which will go through a $\frac{1}{4}$ -inch screen instead of Coal, Slack or Culm, &c. Senator Allison has made a public statement in the Senate that the error will be corrected with other amendments proposed to the bill. It must be confessed that the Senate bill is not wholly satisfactory to the iron men, although Senator Aldrich says that, as a rule, it meets with very general approbation.

If the Republicans carry the day, the bill will be much amended in the direction of protection.

Rifles of Small Caliber.

With the introduction of repeating rifles for purposes of war a reduction in the caliber of the barrel became almost unavoidable. The French Government perceived this at a very early date, and the new Lebel rifle issued to the French army has a bore slightly less than $\frac{1}{4}$ inch. Austria and Germany for economical reasons retained in their new repeating rifles the caliber of the old breech-loaders with which their armies had

hitherto been furnished. This policy, however, has proved to be of the penny-wise type, as both Governments have now found it necessary to adopt the small bore, which has, in the first place, the advantages of decreasing the weight of the arm and increasing the number of cartridges which a soldier can carry with him into the field, and, since the adoption of the magazine is likely to lead to increased rapidity of fire, this becomes a matter of the first importance. Again, as the flatness of the trajectory depends, other things being equal, on the initial velocity of the shot, which, again, is dependent on the ratio of the weight of the shot to the powder charge, the small caliber has another advantage, for, with a large caliber, the ratio of the weight of the shot to that of the powder cannot be made to have the most advantageous value without increasing the powder charge or unduly diminishing the length of the shot. The former plan is out of the question, as the kick of the weapon is quite as great as is pleasant to the marksman now, while the latter remedy is also incapable of adoption, as it would lead to inaccuracy of fire. Both these objections can, however, be got over by the adoption of the small bore, as the powder charge need not be altered, and the length of the bullet may be made equal to that found practically to give the best results. In the Werndl rifle of the Austrian Government, the caliber of which is 11 mm., the pitch of the rifling corresponds to one turn in 724 mm., while in the Swiss Hebler rifle, having a caliber of 7.5 mm. and an initial velocity of about 1900 feet per second, the pitch is 240 mm. But by thus increasing the pitch it becomes necessary that the bullet should, to take the rifling, be provided with a thin outer shell of some harder material than lead. In the Lebel rifle a skin of German silver is used, and in the new rifle for the British Army it is proposed to employ a thin shell of steel for this purpose.

The General Deficiency bill just passed by Congress, and which is virtually the last act of the session as concerns appropriations, makes a total formidable amount. There were five deficiency bills the present year, aggregating \$19,561,382.52. This makes the total appropriated by bills purely for that purpose \$296,824,434.31. To this must be added the permanent annual appropriations, amounting to \$115,640,798.90, which require no bills. The miscellaneous appropriations for the present year will figure up \$9,500,000, as against \$4,811,991.49 last year. The estimates of the departments for the fiscal year were \$302,303,164.74, and of this amount asked for \$296,824,434.31 was granted by Congress. Of this sum but \$282,363,370 was in the bills when they were reported to the House from the various committees, the increase of \$14,401,106.31 being added in the House or Senate. The estimated revenues for the year are \$440,563,734.32, out of which must come about \$422,000,000.

Our Pittsburgh correspondent telegraphs us that important changes have taken place in the firm of Carnegie, Phipps & Co., Limited, and of Carnegie Brothers & Co., Limited. John Walker has resigned the chairmanship of Carnegie, Phipps & Co., on account of ill health, retiring altogether. He is succeeded by W. L. Abbott, till now vice-chairman, the latter post being filled by H. Curry. W. P. Palmer has been elected secretary. Henry Phipps, Jr., has resigned the chairmanship of Carnegie Brothers & Co., Limited, but retains a financial interest. David A. Stewart, until now vice-chairman and treasurer, is his successor, while J. G. A. Lieshman becomes vice-chairman.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., October 16, 1888.

Pig Iron.—The market is a shade quieter this week, but it cannot be said that prices have weakened, although the feeling is hardly as buoyant as it was some time ago. The increase in the output is probably having some influence, although as yet there is no indication of over-supply; neither is there any manifestation on the part of makers of a desire to extend sales for deliveries beyond their usual limits of time. Consumption is very large, however, and it seems as though the last quarter would be much the heaviest of the whole year, so that prices are not likely to vary a great deal, neither is there any great probability of stocks accumulating. The comparative dullness of the market, therefore, may be due, as we said before, partly to knowledge of the fact that production is increasing, and in part to the fact that purchases could not be duplicated to any extent without paying an advance in prices of more or less importance. Under these circumstances consumers are willing to wait further developments, such as the result of the Presidential election, as well as to see what effect the increase in the furnace output will have, and also to ascertain if any further increase will be made. A waiting market, therefore, is the natural outcome of recent events, and does not by any means indicate that prices are likely to react. For the present, all the good Iron that is made finds its way direct into consumers' yards, so that those who are waiting for desirable brands at prices ruling five or six weeks ago may perhaps have to wait a long time before their orders can be placed. Still there is an impression that prices are high enough for a permanency, and that a further advance might be somewhat perilous. Meanwhile quotations vary from \$18 to \$19 at tide for No. 1 Foundry, \$17 @ \$18 for No. 2, and \$16 @ \$16.50 for Gray Forge, according to character of brand, &c., with a few choice makes at the usual premium of 50¢ to \$1 7/8 ton.

Blooms.—Prices are steady, and the demand moderately active at about last week's prices, say: Nail Slabs, \$29 @ \$29.50, at mill; Billets from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 7/8 "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$30 @ \$31 for Nail Slabs; \$34 @ \$36 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—The scarcity of good Bars has finally resulted in advanced prices, which are now quoted at \$29 @ \$29.50 at mill, or \$30 @ \$30.50 delivered, with sales at these figures, holders showing increasing firmness at the extreme outside rate.

Bar Iron.—There is not quite as much firmness in Bars as was noticeable a week ago. Some of the Western mills have been offering Bars at much lower figures than those named by local concerns; but it is not known that they have taken much business. Mills around here are so full of work that they have not changed figures, although on a firm offer for a desirable specification some of them might be inclined to do so, but it would depend on the amount of work they had on their books, and the kind of order that was offered to them. Skelp Iron is still in good demand, and strengthens the Bar mills considerably. A lot of 1500 tons was taken yesterday

at 1.95¢ for Grooved, although 2¢ is the usual quotation for the general run of orders. Bars are 1.85¢ @ 2¢ for best makes, and, apart from Western competition, these are considered to be firm quotations.

Plate and Tank Iron.—Reports on this class of trade are somewhat contradictory. There is undoubtedly a great deal of work on hand, and prospects seem to be very encouraging, but prices are irregular. They are a trifle higher than they were early in September, and are steady at the advance, but that appears to be all that can be said. Large orders are sharply competed for, and only small or medium sized lots command full quoted rates, which are about as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3 1/4¢; Fire-Box, 3 1/4¢ @ 4 1/4¢.

Structural Iron.—There is not much new business coming in, and some of the mills are beginning to feel a little anxious for orders. Deliveries on old contracts comprise the heaviest portion of the work that is going on, although there is a fair daily demand for small lots. Prices are unchanged as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand is well maintained and mills are getting all the work they can handle for the present. Prices are unchanged, and for small lots of the best makes are about as follows:

Best Refined, Nos. 26, 27 and 28... 3 1/4¢ @ 3 1/2¢
Best Refined, Nos. 18 to 25... 3¢ @ 3 1/4¢
Common, 1/2¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28... 4 1/4¢ @ 4 1/2¢
Best Bloom Sheets, Nos. 22 to 25... 4¢ @ 4 1/4¢
Best Bloom Sheets, Nos. 16 to 21... 3 1/4¢ @ 3 1/2¢
Blue Annealed... 2.8¢ @ 3¢
Best Bloom, Galvanized, discount... 62 1/2¢
Common, discount... 67 1/2¢

Steel Rails.—Small lots are in fair demand at about \$20 at mill, but large orders are not on the market at present. There is not much doing for next year's delivery, sellers being almost as indifferent as buyers are, until they can see a little further ahead. The extreme range of prices may be given as \$28.50 @ \$29.50 at mill, according to quantity, delivery, terms of settlement, &c.

Old Rails.—There is still a singular lack of business in this market. Buyers are bidding \$23 for T's, and sellers are offering mixed lots of T's and D. H.'s at \$24, which may be taken at about that figure. Sales for deliveries at interior points are reported at from \$24.50 to \$25, but there is nothing doing in spot lots.

Scrap Iron.—The feeling is a shade firmer, holders asking extreme figures, with plenty of demand at slight concessions, which, however, are not granted. Quotations about as follows: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Merchant Steel.—A fair demand at prices quoted herewith—viz.: Tool Steel, 8 1/2¢; Machinery, 2.6¢; Crucible Spring, 4 1/4¢; Open-Hearth Ordinary Spring, 2.7¢ @ 2.9¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Wrought-Iron Pipe.—The demand seems to be increasing, and manufacturers are greatly crowded with orders. Prices are unchanged, but the feeling is so strong that a reduction in discounts may be made at an early date. Meanwhile they remain as last week, viz.: Black Butt-Welded, 52 1/4¢; Galvanized do., 42 1/4¢; Black Lap-

Welded, 62 1/4¢; Galvanized do., 52 1/4¢; Boiler Tubes, 60¢.

Nails.—There is no material change to notice, although the demand is probably a little better than it has been for some time past. Prices are quoted at from \$1.95 to \$2 from store, and on the whole these figures are fairly maintained for standard quality of Nails.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, October 15, 1888.

Pig Iron.—A few good sales are reported as having been made to the general foundry trade, and some dealers enjoyed a fair run of 50 to 100 ton orders, but others have had a very dull week. The high prices asked for certain brands have checked their sales for the time being, and they are practically out of the market until the prices of other brands advance or the makers are willing to allow a concession. Inquiries are being received from Car-Wheel manufacturers who need an additional supply of Charcoal Pig Iron, and the rapid depletion of the stocks of others will cause them also to renew purchasing, so that the demand from this source is shortly expected to develop considerable business. The architectural foundries are the dullest in the list just now, but they are reaching out for work in new channels, and prospects are bright for some of them to secure good contracts. It is expected that one of the local foundries will be able to capture a 4500-ton order for Castings for a cable road in Kansas City, which will be given out this week. Prices of Southern Coke Iron are a little easier, and if there is to be any break in the general firmness now manifested along the line it will probably begin with this Iron, which has for some time had but little foothold here. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$20 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$17.50 @ \$18.50; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband) No. 1, \$19.75 @ \$20; other Ohio Scotch Irons, No. 1, \$18 @ \$19; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$17.50; No. 3, \$16 @ \$16.50; Southern Coke, No. 1 Foundry, \$17.75 @ \$18; No. 2 Foundry and No. 1 Soft, \$17.25; No. 3 Foundry and No. 2 Soft, \$16.50; Gray Forge, \$16.

Bar Iron.—The general market has been exceedingly dull. Sellers are anxiously waiting for the expected closing of large contracts for cars which have been pending for some time, and which will require a considerable quantity of Bar Iron. The "car talk" runs high into the thousands, but the only orders which are deemed positively certain to be placed at this time will foot up about 4000. Mill agents are of the opinion that car specifications will rule about 1.75¢, flat, delivered, but it remains to be seen how well the price will be maintained when actual orders are in sight. Weakness among manufacturers is rumored with persistency, but agents all insist that prices of Common Iron are firm at 1.75¢ @ 1.80¢, half extras, f.o.b. Chicago, for mill lots. Store prices for small lots range from 1.90¢ to 2.10¢, according to quantity and quality. Sales of Splice Bars have been made at 1.85¢ @ 1.90¢, delivered.

Structural Iron.—Business is quiet and without any special feature. Mill lots are quoted as follows, f.o.b. Chicago: Angles, 2.20¢ @ 2.25¢; Universal Plates, 2.25¢; Tees, 2.55¢ @ \$2.65; Beams and Channels, 3.40¢. Prices from store are: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.75¢; Beams, 3.80¢. A moderate movement in Car-Truck Channels is reported at 2.45¢ @ 2.50¢, Chicago.

Plates, Tubes, &c.—An improved demand for Plates has been experienced, trade from store having been heavy during the week, with a satisfactory sprinkling of mill orders. The volume of business is fully up to that of last year in this branch. Prices are firmly maintained, both from mill and from store. Tubes have advanced about 4%, and the mills are so well supplied with orders that another upward turn would not be surprising. Stocks of tubes here are quite small, so that the advance takes effect at once. Quotations from store are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60½% off.

Sheet Iron.—Mill agents are still unable to supply the demand upon them for light gauges. A few sales have been made for December delivery at 3¢ at mill for No. 27, but the urgency is for earlier deliveries. Small lots from store are sold by jobbers at 3.20¢ for No. 24, 3.30¢ for Nos. 25 and 26, and 3.40¢ for No. 27.

Galvanized Iron.—The situation is unchanged, stocks in warehouses here being more badly broken than ever and the mills still far behind in their orders. The lighter sizes continue to be in greatest demand. Contrary to the general expectation, prices remain as previously quoted—namely, 60% off for Juniata and 60 and 5% off for Charcoal, in small lots.

Merchant Steel.—The current trade is now confined to small lots from local consumers, but is by no means dull on that account, the sales of the past week being very satisfactory. Association prices are quoted without variation as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8¼¢ @ 9¼¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Small orders accumulate from week to week, sufficient to keep up a semblance of business, but not to impart activity to the trade. The Union Steel Company will shut down their works this week for lack of orders, but the North Chicago and Joliet mills will be kept going for another month or two. Inquiries are becoming more numerous for prices on deliveries next year, but the quantities named are about one-third of the usual requirements of each company, which is not very reassuring. As far as can be learned, no prices have been fixed in this market on next year's business. Rumors are current of sales for early delivery at low prices, but the manufacturers contradict them, and quote \$30 as the minimum.

Old Rails and Wheels.—In spite of general expectations, the price of Old Iron Rails holds its own well. A sale of 1000 tons was made at \$28.50, and another of 500 tons at \$24, and some holders are expecting to realize \$24.50 on lots which they control. Consumers in this vicinity appear to be well supplied for the present, but, on the other hand, the railroads are not offering Old Rails in any considerable quantity. Old Car-Wheels are nominally quoted at \$20, with very light transactions reported.

Scrap Iron.—A large part of the available supply of Wrought Scrap in this vicinity was bought for consumption last week. More inquiries are in the market, and bids at a shade below quotations have been refused. Mill Scrap is also in some demand, and Cast is beginning to move. Steel is rather quiet, but a few transactions are noted in this class of material also. Dealers are now paying \$14 @ \$15 for Mixed Country Scrap. The selling prices of carefully selected Scrap are as follows, per ton of 2000 lb: No. 1 Forge

or Railroad Shop, \$21; Track, \$20; No. 1 Mill, \$16.50; Pipes and Tank, \$12 @ \$13; Light Wrought, \$12; Horseshoes, \$20; Axles, \$26.50; Cast Machinery, \$15; Stove Plate, \$12; Cast Borings, \$10; Wrought Turnings, \$12.50 @ \$13; Axle Turnings, \$15; Coil and Leaf Steel, \$17; Locomotive Tires, \$16.

Hardware.—The volume of business continues about the same as that of September, merchants generally reporting a good influx of orders, with the prospects very favorable for the immediate future. No discouraging symptoms have appeared in any branch, and prices are being maintained very well. Collections are not so good as might be expected, but this is explained on the ground of the upward movement in values of farm produce. As farmers rarely sell on a rising market, those who deal directly with them will be obliged to wait until they are influenced to dispose of their stocks of grain, &c. This causes a general tightness of money all along the line.

Nails.—The manufacturers of Cut Nails have apparently weakened in their attempt to hold up prices until the combination is formed. Last week the most obstinate supporters of the regular price gave way and the rate named by one or two concerns became common. Other concessionists followed on the part of the leaders in reducing prices, and Steel Nails were sold here from factory at about \$1.90. These low rates were not made to secure large orders, as might be supposed, but to make sales of 1000 kegs and less, and it is very probable that the volume of actual business was not increased in the least by the break. Jobbers are quoting Steel Cut Nails at \$2.05 @ \$2.10 and Wire Nails at \$2.60 @ \$2.65, in small lots, and report a fair trade in progress, but no demand for carloads worth mentioning.

Barb Wire.—The demand is still very limited, and prices are extremely irregular. Small lots from store are quoted at 2.90¢ for Painted, and 3.60¢ @ 3.65¢ for Galvanized.

Pig Lead.—This market has been dull recently, and prices have receded from 5.05¢ to 4.90¢, with very slight transactions. Consumers seem to be well supplied and not inclined to speculate on the future condition of trade.

Copper.—Manufactured Copper holds its own at 25¢ rates, with fair quantities of Sheets going into the hands of roofers, and some demand from other classes of consumers.

Joseph T. Ryerson & Son, 18 to 22 Milwaukee avenue, Chicago, have issued a stock sheet for October, showing the number and size of the Iron and Steel Plates and Sheets in their warehouse at the beginning of the month. It is a 24-page pamphlet of convenient size, and contains in addition to the stock list a great deal of information of interest to Boiler and Tank manufacturers. Special attention is called to the new Eclipse Manhead, which is therein illustrated and described. This is said to be the only solution of a tight joint for a manhole. The Manhead rests on a heavy lead gasket, and can be taken off and put back again without renewing the gasket.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, October 16, 1888.

Pig Iron.—Brokers and furnacemen report little or no change during the past week; there is a very fair demand, and prices are steady. There is no pressure on the part of furnacemen to sell, nor any particular anxiety on the part of consumers; many of the former are sold up for

the present year, while many of the latter have covered their wants for the same time. The opinion generally obtains that there will be but little change in prices between now and January. It is encouraging to know that the spirit of speculation which at one time threatened to take hold of Pig Iron has died out, and is not likely to come to life again at present. Our market is in an exceedingly healthy condition, and the business is between producers and consumers, with the assistance of the brokers, who help to get the former together. The great proportion of the Iron used here is the product of furnaces here, and in the Shenango and Mahoning valley districts, very little, if any, coming here from east of the mountains, while in regard to Southern Iron there has been none sold in this market for several years. We quote prices as follows:

Neutral Gray Forge.....	\$16.00 @ \$16.50,	cash.
White and Mottled.....	15.00 @ 15.50,	"
All Ore Mill.....	17.00 @ 17.25,	"
No. 1 Foundry.....	18.00 @ 18.50,	"
No. 2 Foundry.....	17.00 @ 17.50,	"
No. 1 Charcoal Foundry.....	17.00 @ 24.50,	"
No. 2 Charcoal Foundry.....	22.00 @ 22.50,	"
Cold Blast Charcoal.....	25.00 @ 28.00,	"
Bessemer Iron.....	18.00 @	"

Included in the sales reported was a lot of 1200 tons Gray Forge, for December delivery, at \$16, cash; 1000 tons Bessemer at \$18, cash, and 900 tons Charcoal, for mill use, at \$19, cash.

Muck Bar.—There is a fair business at unchanged prices, \$28.50 @ \$29, cash. Sales of some 2000 tons reported at \$28.50 @ \$28.75.

Manufactured Iron.—There is a continued steady demand for all kinds of Finished Iron, and the mills generally are pretty well employed, some of them working double time. No change in prices, which, as already stated, are low as compared with cost of Pig Iron. Bars at 1.80¢ @ 1.85¢; Plate, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢. There has been quite an active demand for Sheet Iron for some weeks past, as there usually is at this season of the year. There is no apparent abatement in the demand as yet for Skelp Iron, but there will be within a few weeks, as the Pipe trade commences to fall off the latter part of this month. Grooved is still quoted at 1.85¢ @ 1.90¢, and Sheared at 2.10¢ @ 2.12¢.

Nails.—The Nail trade continues light, and there is but little prospect of any improvement until toward spring. Prices are steady at full card rates, but they are unremunerative; yet trade is so light that it is not likely that there will be any immediate effort made with a view to advancing them. We continue to quote upon a basis of \$1.90 for 12d to 40, 60 days, 2% off for cash.

Ferromanganese.—Sales of 80% Ferromanganese at \$56.50 @ \$57. Sales of Speigel at \$28 @ \$28.50 for 20%.

Wrought-Iron Pipe.—There appears to be no falling off in demand, and prices are reported firm at the advance of last week. Mills generally are running pretty full, but the demand, it is probable, will commence to fall off with the close of this month. Discounts on Black Butt-Welded 52½%; on Galvanized do., 49½%; on Black Lap-Welded, 62½%; on Galvanized do., 52½%; Boiler Tubes, 60% off; 2-inch Tubing, 13¢ per foot net; 5½-inch Casing, 40¢ per foot, net.

Old Rails.—There has been little or no new business in Old Iron Rails during the past week, but while the market is less active prices are still maintained. Consumers are pretty well stocked for the present, but stocks in hands of sellers are not large, and there is no disposition to force sales. We continue to quote American Tees at \$25 @ \$25.25, cash, at which the last sales reported were made.

further advance at present, but full prices are obtained for all orders taken. Buyers continue to request shipments hurried to them, and in many cases stocks are allowed to run so low before orders are given that should any delay occur on account of furnace not having the particular grades when order is received the consumer is put to considerable trouble and expense on account of the delay. Several orders for round lots from desirable customers at full prices have been refused by furnaces this week on account of the delivery being after January 1. With a steady and firm market we quote as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.75 @ 20.25
Lake Superior Coke, cinder mixed.....	18.50 @ 19.00
Standard Ohio Black Band.....	19.75 @ 20.25
Southern No. 1.....	17.75 @ 18.25
Southern Gray Forge.....	16.25 @ 16.75
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	20.50 @ 21.50

New York.

Office of *The Iron Age*, 66 and 68 Duane street. NEW YORK, October 17, 1888.

American Pig.—The reports of agents and dealers concur quite generally in representing the market to be quiet, but firm. We do not hear of sales of any magnitude, except in the case of one firm, representing Southern furnaces, who have done some business, partly for next year's delivery. It is stated that one of the leading Lehigh companies has an unusually large stock of Low-Grade Irons, but that the quantity of metal of Standard quality that is available is small. We quote: Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—Only small quantities are being sold by importers, who claim that they are rapidly exhausting that part of their supply which they could apply to low freight charters contracted for in the past. We quote: Coltness, \$21.50 @ \$21.75, nominally; Shotts, \$20.75 @ \$21; Langloan, \$21, and Dalmellington, \$20.50 @ \$20.75.

Spiegeleisen and Ferromanganese.—We hear of a sale of 2000 to 3000 tons of 20 % Spiegeleisen to an Eastern mill for delivery January and February, at a price which indicates that the seller is willing to take risks in freights. We quote \$26.50 @ \$27, according to time of delivery. There have been sales of several hundred tons of Ferromanganese at \$54 for foreign, importers now asking \$54.50.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Steel Rails.—No sales of any consequence are reported by Eastern mills, though it is understood that negotiations are pending for a number of orders and that possibly some of them may have been placed. From the West it is stated that of the Chicago, Burlington and Quincy Railroad order 20,000 tons has been placed with one of the Chicago mills, while 10,000 tons has gone to Pittsburgh. The trade has been much interested during the past week in the interviews attributed to Mr. Carnegie, though his statements that Rails were selling at \$28 at Pittsburgh is somewhat at variance with figures which have been quoted by the firm in that city for some time past. The outlook for Rails is not regarded as very encouraging. Up to the 1st of October, according to the report of the Board of Control, the shipments were 921,863 tons. Last year the ship-

ments up to the same time were 1,390,825 tons. The sales had been 1,838,126 tons, while this year they have been only 1,134,883 tons. Last year the sales for 1887 delivery were nearly as large on the 1st of January of that year as they have been for 1888 delivery on the first of October, 1888. This is beginning to extend into the next year. On the 1st of October, 1888, the total sales for 1889 delivery footed up 40,000 tons. The outlook is therefore far from encouraging, especially when some other features in the railroad situation are taken into account. The developments among the Northwestern roads during the past few months, including such events as the passing of the St. Paul dividend and the reduction of that of the Atchison, together with the report that the Rock Island will build no further extensions—all these circumstances indicate what, for the near future, there may be expected in the way of new mileage by old companies in the Northwest. In some parts of the Southwest the situation is not much better. While it will be conceded that renewals are urgently needed with a good many lines, still even an active demand for that purpose is insufficient to give full and fair employment to our Rail mills unless it was accompanied by a demand for new construction, represented by a minimum of 6000 to 8000 miles of new road. There are a number of inquiries in the market, partly for next year's delivery, among them being one for an Oregon road, for which figuring is going on with Western mills overland, Eastern mills to tidewater and vessel, and English mills. So far as the latter are concerned, they are practically out of the market, since it would cost at least \$48 to put Rails down at the Pacific port, while the domestic, via New York, could be delivered at about \$42. We quote \$28 @ \$28.50 at Eastern mill.

Wire Rods.—The market is quiet, though there is some inquiry for early delivery. For prompt shipment we note a recent sale of 1000 tons at \$39.25 to an Eastern Wire Nail manufacturer. We quote \$39.25 @ \$39. A meeting is to be held at an early date of the German syndicate. It remains to be seen what action it will take in face of the fact that the American market is being rapidly taken away from it by our domestic market.

Old Rails.—Outside of a lot of 1000 tons of Tees taken by an Eastern mill at \$23.50, here, no business of consequence is reported in the market. A large consumer in the Pittsburgh district is reported to have secured some stock in other quarters. While the demand is not entirely filled, East or West, manufacturers are operating very carefully, though it is probable that any decline would bring out some buying. We quote, nominally, \$23.50 for American Tees.

Financial.

The colossal "grain bulge" which has more or less affected all legitimate business in a large measure has subsided, so that, although prices of many staple commodities are unsettled, the tendency is toward a more stable basis. The reaction in wheat and breadstuffs in Chicago was at once manifest in this market, corn following, and day by day fluctuations have been less violent. On Monday there was again a sharp decline, wheat dropping 4¢ @ 4½¢, compared with Saturday. Several large houses were heavy sellers. Spots are heavy at the decline. Breadstuffs were dull, in the absence of demand, either domestic or foreign, the relative high prices on this side keeping exporters out of the market.

The effect of high prices of flour, which advanced here \$2.25 in a month, is shown

in the operations of West India and South American markets, whose trade heretofore has been almost exclusively with this point. Reports are that the West Indies are dickering with Spain for supplies of flour, also that South America is looking to Hungary for shipments by way of Trieste. Estimates made upon the basis of the Government report generally make the yield of winter wheat 276,000,000 bushels, and that of spring 134,000,000 bushels; total, 410,000,000 measured bushels, and equivalent to about 290,000,000 bushels of 60 lb. The Cincinnati *Price Current* estimates the total crop at 270,000,000 bushels of 60 lb. The Government returns for October show that the condition of the present corn crop has been equaled only three times in ten years and is exceeded materially only by that of 1879, when the condition was 98. The present average of condition is 92.

The Stock Exchange markets were generally dull, but strong. The street is now comparatively indifferent respecting the loaning rates of the Bank of England, since the free purchases by the Treasury and the consequent ease in money. A feature was the reaction in Atchison, Topeka and Santa Fé, from the previous rapid decline. New England followed the advance. On Friday stocks were almost stagnant, except for specialties, some of which record sharp advances. On Saturday the tendency was again downward. On Monday Lower prices in London, and the break in wheat induced caution and the market generally fell off. On Tuesday the market opened off and there was a further decline, led by New England, the grangers and the coal shares. Then came an irregular recovery.

Government bonds were weaker for 4s. Quotations are as follows:

U. S. 4½, 1891, registered.....	108½
U. S. 4½, 1891, coupon.....	108½
U. S. 4s, 1907, registered.....	127½
U. S. 4s, 1907, coupon.....	127½
U. S. currency 4s.....	121

Now that the Southern scourge is disappearing, speculation less rampant, and the financial situation improved, the business outlook is encouraging. The movement of freights is of unusual volume, partly in anticipation of the close of navigation. Florida routes, too, are reopened. From Chicago, during the second week in October, the total shipments were 62,000 tons, against 59,100 the previous week and 36,591 tons for the same week last year. The outward movement of cotton and corn will shortly be in large proportions. Cotton in this market is quiet; prices steady. Coffee firmer in a speculative way and teas pretty strong, but sugars are quoted a shade easier for raws. Lard dull and unsettled; trading light. Ocean freights—room for cotton and corn is in urgent demand, with engagements on a liberal scale.

The recent upward tendency in the rates for money was arrested by the acceptance by the Secretary of the Treasury of large amounts of bonds. Money on call averaged about 2½%. The offerings of money on time were liberal, the demand small. Quotations were 4 @ 5½% for four to six months on good collateral. There was only a moderate supply of commercial paper, and rates were 4½ @ 5½% for 60 to 90 days. Simultaneously with the change for the better in the loan market on this side there was an equally pronounced movement in London, where rates settled considerably below the bank figure. The action of the open market in thus refusing to support the Bank of England revives apprehensions of gold shipments. Sterling exchange is quiet at \$4.84½ @ \$4.89.

Acting-Secretary Thompson issued the following: "Notice is hereby given that until otherwise ordered the Secretary will not accept offers of bonds that are held as security for National bank circulation."

The statement that the Department has practically decided to limit future bond purchases to a few millions a month is emphatically denied. There had been no change whatever in the policy of the Department. In the matter of future purchases, the action of the Department will be governed altogether by the "rates at which offers were made and the exigencies of the situation." The total amount of bonds purchased to date under the circular of April is \$84,670,750, of which \$51,392,000 were 4 per cents and \$33,278,750 were 4½ per cents. The cost of these bonds was \$66,005,539 for the 4s and \$35,896,192 for the 4½s, making a total of \$101,901,731. Notwithstanding these heavy payments the Treasury surplus is stated at \$98,000,000.

The gross clearings of 38 cities show an increase of 3.4 % over last year; outside of New York, 10.4 %; New York gained 0.4 %; Boston, 10.6 %; Philadelphia, 5.4 %; Chicago, 17.3 %; St. Louis, 13.2 %; San Francisco, 0.9 %; Baltimore, 14.9 %; Pittsburgh, 17.4 %; Kansas City, 73.1 %; Milwaukee, 11.4 %; St. Paul 11.9 %; Omaha, 37.6 %; Minneapolis, 40.8 %; Denver, 34.5 %; Galveston, 41 %; Detroit, 34.8 %; Cleveland, 2.9 %; Indianapolis, 4.4 %; Hartford, 18.3 %; Peoria, 13.2 %; and Topeka, 87.2 %. Cincinnati decreased 11.7 %, New Orleans, 15.8 %; Louisville, 0.7 %; Providence, 9.7; Columbus, 15.5 %; Wichita, 19.2 %; Duluth, 9.1 %; Norfolk, 0.2 %, and Syracuse 12.3 %.

The weekly bank statement showed unexpectedly a decrease of \$1,102,950 in the surplus reserve, notwithstanding the fact that the Treasury purchased during the week \$19,815,850 of bonds and that the banks thereby gained nearly \$11,000,000 from the Treasury in cash. The reserve now stands at \$10,314,550, against \$11,417,500 last week, \$7,260,200 for the corresponding week in 1887, and about \$4,618,900 in 1886. The heavy drain of currency was principally in aid of the movement of cotton in the South. The demand from the West was hardly as pressing. In loans there was an expansion of \$1,606,800. Specie showed an increase of \$147,100, and legal tenders decreased \$823,300. Deposits increased \$1,707,000, and circulation increased \$1400.

The gross railroad earnings for the month of September make an unfavorable exhibit, due in part to the yellow-fever epidemic in the South, the small movement of cotton and comparison with heavy earnings in 1887. With the improvement in the rate situation, which now bids fair to become general, the movement of the crops, the activity in general trade and the prosperous condition of the coal trade, earnings for the last quarter of the year should materially increase.

The imports of merchandise at this port during the week were large, aggregating \$9,053,900, of which about \$2,500,000 represents dry goods. Total since January 1 \$369,006,000, as compared with \$370,843,000 for the same time last year and \$343,126,000 in 1886. Exports were \$6,769,000, including 700,000 bushels of corn and 30,000 bales of cotton. The exports from all Atlantic ports last week were only 23,285 bushels, and of this 15,000 bushels went from Newport News to Brazil, and of the remainder only one load to the United Kingdom. This is the smallest export business within remembrance.

The exports of specie from this port during the week were \$702,000, and the imports \$111,000; total since January 1 \$29,697,000 and \$6,922,000 respectively, against \$14,250,000 and \$32,965,000 for the corresponding period last year.

Breadstuff exports during September aggregated in value \$11,715,193, against \$11,094,132 in September last year. Cotton exports amounted to 180,214 bales

last month, valued at \$8,814,672, or \$5,000,000 less than in September, 1887. Mineral oil exports during September last aggregated in value \$3,874,719, or about a quarter of a million less than in September, 1887.

The East Side Bank, at the junction of Grand and Division streets, has opened for business. The officers are Thomas R. Manners, president; Samuel B. Clark, vice-president, and James S. Oakley, cashier. It has a capital of \$500,000.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from October 5 to October 12, inclusive, and from January 1 to October 12, inclusive, were as follows:

Iron and Steel.		Oct. 5 to Oct. 12.	Jan. 1 to Oct. 12.
		Tons.	Tons.
Pig Iron: Crocker Bros.....	735	10,007	
W. H. Walbaum & Co.....	304	704	
Merchants' Despatch.....	300	300	
G. W. Stetson & Co.....	185	12,950	
Naylor & Co.....	180	6,495	
N. S. Bartlett.....	200	4,700	
James Williamson & Co.....	100	4,500	
Spiegel Eisen: Crocker Bros.....	374	9,736	
Dana & Co.....	85	3,488	
Naylor & Co.....	10	9,128	
Steel: Oelrichs & Co.....	100	100	
Cary & Moen.....	50	114	
Pierson & Co.....	45	120	
W. F. Wagner.....	40	1,100	
R. H. Wolf & Co.....	25	466	
R. F. Downing & Co.....	16	2,904	
Ogden & Wallace.....	16	55	
Chas. Huggill.....	8	249½	
F. S. Pilditch.....	7	357	
C. A. Walschid.....	5	5	
J. Abbott & Co.....	5	469	
C. F. Boker.....	4	1,894	
Steel Rods: Dana & Co.....	429	4,533	
Naylor & Co.....	201	16,458	
R. H. Wolf & Co.....	151	3,324	
A. Heyn.....	122	1,411	
J. A. Roebeling's Sons.....	100	1,480	
Steel Sheets: R. Crooks & Co.....	23	346	
Steel Bloom Ends: Dana & Co.....	103	1,128	
Steel Billets: J. Abbott & Co.....	112	1,638	
Steel Rivet Rods: J. Abbott & Co.....	100	4,288	
Steel Blooms: G. T. Carter.....	411	501	
Steel Hoops: A. R. Whitney & Co.....	100	2,114	
Steel Sheets: A. Milne & Co.....	5	57	
Steel Wire: J. A. Roebeling's Sons.....	5	180	
Steel Tires: Naylor & Co.....	4	50½	
Steel Scrolls: Ogden & Wallace.....	15	15	
Swedish Steel Slabs: C. V. Philp.....	45	50	
Swedish Rough Bars: C. V. Philp.....	75	245	
Iron: J. Abbott & Co.....	5	6,321½	
Iron Tivet Rods: G. Lundberg.....	52	510	
J. Abbott & Co.....	51	4,230	
Iron Girders: W. H. Wallace & Co.....	3	314	
Iron Beams: Post, Martin & Co.....	45	62	
Iron Pipes: J. S. Leng's Son & Co.....	3	3	
Iron Wheels: R. F. Downing & Co.....	10	511	
Iron Wire Rods: N. Lilienberg.....	100	590	
Ferromanganese: C. L. Perkins.....	900	5,600	
Charcoal Iron: Naylor & Co.....	165	605	
Scrap Iron: Frothingham, Baylis & Co.....	248	248	
Sheet Iron: T. B. Coddington & Co.....	61	1,249	
Galvanized Iron Sheets: A. R. Whitney & Co.....	10	10	
Wire Rods: S. A. Galpin.....	22	22	
Cotton Ties: Naylor & Co.....	235	5,312	
Bullard & W.....	175	1,645	
Bar Iron: N. Lilienberg.....	200	403	

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	18,727	456,569
Dickerson, Van Dusen & Co.....	12,442	228,799
T. B. Coddington & Co.....	5,750	138,149
A. A. Thomsen & Co.....	5,052	116,478
Pratt Mfg. Co.....	4,709	142,166
N. L. Cort & Co.....	2,259	89,525
R. Crooks & Co.....	1,805	57,928
Central Stamping Company.....	1,777	28,756
Bruce & Cook.....	1,435	81,186
Wolf & Roessing.....	1,222	22,618
G. B. Morewood & Co.....	1,000	39,945
S. Shepard & Co.....	935	18,533
Jas. Byrne & Son.....	890	31,485
C. S. Mersick & Co.....	810	6,116
Lombard, Ayres & Co.....	631	11,843
Consolidated F. Jar Co.....	517	2,014
E. S. Wheeler & Co.....	451	6,700
N. S. Bartlett.....	200	200
H. R. Demilt & Co.....	188	18,549

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	224,746	9,501,669
R. Crooks & Co.....	167,925	694,516
Hendricks Bros.....	114,099	482,154

Phelps, Dodge & Co.....	68,500	1,787,785
Mendel & T.....	38,129	38,129
D. Thomsen & Co.....	22,444	226,467
		Casks. Casks.
Antimony: Phelps, Dodge & Co.....	50	550
American Metal Co.....	25	285
		Pounds.
Irons and Metals Warehoused from October 5, to October 12, Inclusive:		440,111
Lead: Schultz & Rueckgaber.....		111,994
Spelter: Lewisohn Bros.....		

Hardware, Machinery, &c.

American Contracting and Dredging Company	
Old Mach'y, pcs., 22	
Barbour Bros. & Co., Mach'y, pkgs., 21	
Bernard, Geo., Ironwork, bdls., 44	
Bittel, Tepe & Co., Mach'y, cs., 84	
Boker, Hermann & Co., Arms, cs., 31	
Curley, J. & Bro., Cutlery cs., 2	
Downing, R. F. & Co., Chains, cks., 40	
Folsom Arms Company, H. & D., Mdse., cs., 2	
Feld, Alfred & Co., Mdse., cs., 34	
Foley, Edward, Mach'y, pkgs., 14	
Garcia, J. B., Mach'y, pkgs., 2	
Graef Cutlery Company, Cutlery, cs., 11	
Hart, A. W. & Co., Winding Mach'y, cs., 3	
Hartley & Graham, Arms, cs., 29	
Irwin, Chas., Arms, cs., 18	
Lau, J. H. & Co., Arms, cs., 14	
Merchants' Despatch Co., Arms, cs., 6	
Meyer, C. & Co., Mach'y Parts, pkgs., 38	
Perez, Triano & Co., Steam Pump, box, 1	
Schoverling, A., Arms, cs., 29	
Shoverling, Daly & Galea, Arms, cs., 10	
Taylor, Thos., Mdse., cs., 6	
Wiebusch & Hilger, Lim., Arms, cs., 5; Anvils 316; Mdse., cs., 4	
Order, Steel Shoes, 42; Mach'y, cs., 6	

Exports of Metals.

	Oct. 5 to Oct. 12.	Jan. 1 to Oct. 12.
	Pounds.	Pounds.
Copper: J. Abbott & Co.....	228,207	11,346,826
Lewisohn Bros.....		3,429,022
F. A. Lomal.....		2,581,238
American Metal Company.....		5,029,982
G. H. Nichols.....		223,969
J. Bruce Ismay.....		112,000
S. Mendel.....		560,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Company.....		224,084
J. Kennedy, Tod & Co.....		112,025
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....		449,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....	149,000	1,428,130
J. Parsons & Co.....		420,000
Naylor & Co.....	56,200	448,800
Bridgeport Copper Company.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Ladenburg, Thalmann & Co.....		229,371
W. H. Crossman & Bro.....		4,000
R. Crooks & Co.....		1,000
Copper Matte: Williams & Terhune.....	434,540	34,817,138
Lewisohn Bros.....		3,021,610
American Metal Company.....	485,541	3,114,643
J. Abbott & Co.....		295,000
C. Ledoux & Co.....		485,800
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		189,965
Kunhardt & Co.....		41,652
Spelter: Muller, Schall & Co.....		30,000
Copper Ore: John H. Starin.....		28,000
Old Copper: Burgess & Co.....	15,620	600,638
		Tons. Tons.
Pig Iron: Peter Wright & Sons.....	120	600

Coal Market.

The usual heavy autumn business having been largely anticipated by the pressure of orders early in the season, the Anthracite Coal trade just now is quiet, except for domestic sizes. Nevertheless deliveries from first hands are in large volume, taxing transportation facilities up to their full limit. No large amount of new business is reported—that is to say, sales at the latest schedule advance are not yet in any considerable amount—but "at one price or another," some of the companies have all they can do, the Reading, for example, being out of the market for the remainder of October, and some of the fancy brands are all sold up on account of the excessive demand. As to prices, it is commonly understood that the maximum has been reached. Broken is weak; the small Stove sizes continue in excessive supply, and Egg is being sold in Philadelphia below the circular. Some solicitude is expressed lest the market become weighted by heavy production. Quotations are as follows: Hard White Ash, Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Fine White Ash, Broken,

\$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.55.

Production at the mines shows some increase compared with the previous week, but is below the average for some time past. The total for the week ending October 13 is 836,054, as compared with 693,519 tons for the corresponding week last year; increase, 142,500 tons. Since January 1 the total is 29,308,052 tons, against 26,791,814 for the same time in 1887; increase, about 2,500,000 tons.

The Bituminous Coal trade is active and firm at pool prices, the demand being fully equal to the supply. Respecting efforts to harmonize differences in the Seaboard Association, the Philadelphia *Ledger* says: That while no definite arrangements for a renewal of the association were concluded at the meeting held in that city last week, "the representatives of the several districts present agreed to make no contracts for Soft Coal for delivery next year at any price pending the reorganization of the pool, and until the Beech Creek and other interests can be heard from. Another meeting will be held at an early date, to which, it is expected, all the Soft Coal mining interests east of the Alleghenies, from the Pocahontas district north to the Beech Creek, will send a representative."

The Cumberland region reports a tonnage during the week ending October 6 of 73,959 tons, and for the year 2,727,000 tons, as compared with 2,451,000 tons in 1887. The Clearfield production was 70,000 for the week, and for the year 2,598,000, against 2,451,000 in 1887. The stock of Anthracite Coal at tidewater points on September 29 was 370,811 tons, against 396,752 tons on August 31 and 394,748 tons September 30, 1887.

The Lehigh Valley recently ordered 2000 gondola cars, which will be used partly in the Western Coal-carrying trade. The cars will be built in Catsauqua.

The Western New York and Pennsylvania Railroad has just received 1000 new cars, and directors say 1500 more are needed to handle the company's Coal business into Buffalo. The Jersey Central Road is steadily striving to effect a short and direct route from the Pennsylvania Coal fields to New England by way of the Poughkeepsie Bridge. The long pending suits respecting the possession of valuable Coal lands in Sugar Loaf and Black Creek townships, Pa., between C. M. Derringer and Eckley B. Cox have been settled by mutual concessions. It is said that the concession made an equal division of their interests.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Oct. 17, 1888.

It is stated, on apparently good authority, that the negotiations alluded to last week as pending between the French syndicate and the principal mining companies for the control of supplies for a period of nine years have been suspended. The reason for this is not stated. Speculation in Copper has been very moderate during the week. The syndicate holds prices very steady, but makes no efforts to bring about any advance, probably because of there being no great outstanding "short" interest in the market. Purchases by consumers have been comparatively light.

Speculation in Block Tin has been slow. Supplies here are well under control and the statistical position generally is strong, but buyers are comparatively few and extremely cautious. The market, however,

is looking stronger to-day than at any previous time the last fortnight.

The Pig Iron market has changed slightly for the better, mainly in sympathy with a reaction of 1/ on warrants. Speculation is hesitant at the moment, however, and purchases for consumption and export are barely of average volume. On makers' brands of Scotch Pig there has been only slight fluctuations. Hematites have also been without important change, but Cleveland Pig is a shade higher.

Tin plate has been in limited demand, and the condition of the market is practically the same as it was a week ago. At the quarterly meetings continued firmness in prices was reflected.

Tinned and Stamping Sheets have been advanced a sovereign.

The Trevor Plate Company have started up a second mill.

The Steel trade, as a whole, continues brisk and new orders of considerable size are reported in several branches. Bolckow, Vaughan & Co. have booked orders for 40,000 tons Steel Rails, about one-half of which are for South America. The Glasgow Iron Company have secured an order from the States for 1000 tons, and refused to fill a second order for 1500 tons, except at an advance.

Scotch Pig.—There has been a more active business, without, however, material change in prices.

No. 1 Coltness, f.o.b. Glasgow	49/8
No. 1 Summerlee, " "	51/
No. 1 Gartsherrie, " "	47/3
No. 1 Langloan, " "	48/9
No. 1 Carnbroe, " "	43/
No. 1 Shotts, " at Leith	48/8
No. 1 Glengarnock, " Ardrossan	47/8
No. 1 Dalmeilington, " "	42/6
No. 1 Eglinton, " "	41/6

Steamer freights, Glasgow to New York, 7/ Liverpool to New York, 10/.

Cleveland Pig.—Makers firmer on prices, but business only fair. No. 1 Mid-lesboro', G.M.B., 37/6; No. 3 do., 35/.

Bessemer Pig.—Business has been large and prices show more firmness. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen.—The demand is fairly active and the market very firm. English 20% quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—There has been a large business and the market is firm. Standard sections quoted at £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Blooms.—Demand continues good and prices remain firm. We quote £4. 2/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A fairly active business and prices firmer. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Very little doing, but prices held firmly. Bessemer, £4. 1/3, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—The market and prices unchanged. Mild Steel No. 6 quoted at £5. 19/6 and No. 5 at £5. 18/6, f.o.b. at N. W. England shipping point.

Manufactured Iron.—Bessemer continues brisk. Prices are strong, with an advance on Sheets and Welsh Bars. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars....	£ s. d.	£ s. d.
Common	@ 8	2 6
Staff. Bl'k Sheet, singles.....	@ 5	5 0
Welsh Bars (f.o.b. Wales)....	4 17 6	@ 5 0 0

Tin Plate.—No change of importance in the market. Business fair. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/8 @ 16/
IC Bessemer steel, Coke finish.....	14/3 @ 14/6
IC Siemens	14/6 @ 14/9
IC Coke, B. V. grade.....	14/ @ 14/3
Charcoal Terme, Dean grade.....	12/6 @ 13/

Tin.—The market stronger and more active after ruling duller. Straits quoted at £101. 10/, spot, and £102 @ £102. 10/ for three months' futures.

Old Rails.—Demand rather slow, and the market not so firm. Tees quoted at £2. 17/6, and Double Heads £3, f.o.b.

Scrap Iron.—Moderate sales at barely steady prices. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Crop Ends.—The market quiet and unchanged. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Copper.—Only a moderate business, and no material change in values. Chili Bars, £78. 10/, spot, and £78, three months' futures. Best Selected, £81. 10/.

Lead.—The market quiet and barely steady. Soft Spanish, £14. 7/6.

Spelter.—Demand has slackened and prices are weaker. Silesian, ordinary, £18. 12/6.

Metal Market.

Copper.—London declined with Spot and Chili Bars since our last report from £82 to £78. 10/, and Futures from £78. 10/ to £78; while good Merchantable Brands improved from £77. 5/ to £77. 10/; Best Selected remaining £82. Total London sales, 575 tons. The visible supply in England and France decreased from 89,154 tons on October 1 to 87,233 tons on October 16. The stock of Chili Bars at Liverpool and Swansea is cabled this morning as being 26,857 tons. Import of American Copper into Liverpool and South Wales, 9 months, 19,198 tons, against 8937 in 1887. Our market has been utterly stagnant on the Metal Exchange at nominally 17.40¢ @ 17.45¢ for October. It is now asserted that the syndicate contracts with the mining companies have been renewed, extending them to six years with a small restriction in production, and an advance of ¼¢ in the contract price. The Calumet and Hecla under this extended contract will be limited to 50,000,000 lb p annum. It is stated, to-day, that to restrict production is illegal in this country. Messrs. James Lewis & Son-Liverpool, October, say about good merchantable brands that Chili Bars will soon probably be merged into the former, for forward delivery, so as to prevent the recurrence of a corner in Chili Bars.

Tin.—There has been an improvement in spot Tin in London since we last reported, from £100. 15/ to 101. 12/6, and in futures from £101 to £102. 5/, the sales summing up 580 tons. Our own market has been dull and irregular, total sales not exceeding 90 tons at 23¼¢ spot, and October to December, 22.80¢ to 23.15¢. The improvement in the London market is due, it is stated, to an improving statistical position. **Tin Plates.**—A moderate demand has prevailed for Tin Plates on the spot, with a slight shading on Charcoal finish and Wasters. Futures have been neglected, because they are considered held too high. At Liverpool small lots can be had a little lower, but large lines are held at 18/6 for Cokes. We quote to-day, at the close, for large lines on the spot, Siemens-Martin Steel, Charcoal finish, \$5.20 @ \$5.75; Coke finish, \$4.70; Terns, \$4.25 @ \$4.35; Bessemer Cokes, \$4.50 @ \$4.55, and Wasters, \$4.25.

Lead.—Hardly anything has been done in the open market, and that little on

private terms, the present spot price being 4.80¢. On 'Change altogether 880 tons changed hands. On Thursday the price suddenly dropped to 4.65¢, then rose to 4.97½¢, but subsequently closed at 4.80¢. The Western markets have remained uninfluenced by the weakness here, ruling at 4.90¢ to 5¢. Soft Spanish has been steady in London at £14. 7/6 and English Pig at £14. 12/6. To-day 350 tons were sold, including October up to 4.90¢, November at 4.75¢ and January at 4.25¢. The market closes with 4.62½¢ bid and 4.85¢ asked.

Spelter—Has not displayed much life on the spot, yet Common Domestic continues to be firmly held at 5½¢, while Silesian remains nominally 6¢ @ 6.05¢. London has given way with Silesian from £19 to £18. 12/6.

Antimony.—A firm tone has prevailed, with a fair consumptive demand at 12½¢ @ 12¼¢ for Cookson, and 10¼¢ for Hallett, the latter meanwhile declining in London from £42 to £41.

New York Metal Exchange.

The following sales are reported:

FRIDAY, October 12.	
10 tons Tin, October.....	22.70¢
10 tons Tin, October.....	22.60¢
10 tons Tin, October.....	22.75¢
20 tons Tin, October.....	22.85¢
248 tons Lead, October.....	4.90¢
16 tons Lead, October.....	4.82½¢
16 tons Lead, November.....	4.80¢
32 tons Lead, November.....	4.85¢
SATURDAY, October 13.	
16 tons Lead, October.....	4.92½¢
48 tons Lead, spot.....	4.95¢
66 tons Lead, October.....	4.95¢
96 tons Lead, October.....	4.97½¢
32 tons Lead, October.....	5.00¢
48 tons Lead, November.....	4.80¢
MONDAY, October 15.	
64 tons Lead, November.....	4.85¢
50 tons Lead, October.....	4.97½¢
20 tons Tin, October.....	22.85¢
TUESDAY, October 16.	
80 tons Tin, November.....	22.90¢
10 tons Tin, December.....	22.80¢
100 tons Lead, November.....	4.80¢
32 tons Lead, November.....	4.82½¢
WEDNESDAY, October 17.	
10 tons Tin, November.....	23.05¢
10 tons Tin, December.....	23.05¢
25 tons Tin, November.....	23.15¢
100 tons Lead, January.....	4.25¢
16 tons Lead, October.....	4.70¢
80 tons Lead, October.....	4.75¢
32 tons Lead, October.....	4.90¢
115 tons Lead, November.....	4.75¢

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Milreis (Portugal).....	1.08
Milreis (Brazil).....	64.6
Mark (Germany).....	25.8
	Pounds.
Kilogram.....	2.205
Picul.....	134.

BRAZIL.

PARA, October 12, 1888.—*India Rubber*.—The market remains firmly sustained; there were shipped to New York, so far this month, only 171 tons by one steamer.—*Per cable direct*.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, September 14, 1888.—*Asphaltum*.—There has been a steady, moderate demand, at \$14.04 per ton for boiled, and \$6.84 crude, f.o.b., including export duty. Shipments since January 1 aggregate 40,277 tons, against 31,426 same time last year and 25,885 in 1886. *Exchange*, 90 days, on London, \$4.80 @ \$4.86.—*E. P. Mason*.

CHILI.

VALPARAISO, August 23, 1888.—*Copper*.—Has been so sparingly offered that sales were restricted to 7749 quintals during the fortnight, at \$29.45 @ \$30; \$29.45 equals £75. 10/6, f.o.b., with 27 steam freight. No Copper can be had before the middle of October. *Nitrate*.—There has been an advance from \$2.72½, 95 %, to \$2.87½, \$2.90 being the asking price at the close; sales reached 1,500,000 quintals, of which 1,054,000 were 95 %, and 446,000 96 %; \$2.80 equals 87¼¢ per cwt. and 28/9 freight to England. *Coal*.—The many arrivals of Coal from Newcastle have depressed the market to 32/6, while July sail is held at 35/ in consequence of the rise in freights in England. *Exchange* has been pressed on the market, owing to the large Nitrate shipments, 90 days' on London giving way to 26¼¢.—*Weber & Co*.

EAST INDIES.

PENANG, August 31, 1888.—*Tin*.—The receipts reached 11,000 piculs, of which Europeans took 5000 and Chinese 5000. Opening at \$36 per picul, Tin gave way temporarily to \$34.90, but soon recovered the difference. Since January 1 there have been shipped to England 97,339 piculs, against 102,480 in 1887 and 98,704 in 1886; to the Continent, 338, against 2029 and 1630, and to the United States, 7374, against 13,890 and 32,798. *Exchange*, 4 months' bank, 3/1½.—*Schmidt, Kustermann & Co*.

MANILA, October 8, 1888.—*Hemp*.—At \$10.62½ per picul there continue buyers, against \$9 same time last year, equaling respectively per ton, cost and freight, £35. 17/6 and £32. 10/. Clearances for the United States since last cable amounted to 5000 bales, against 17,000 in 1887; since January 1 they reach 152,000, against 171,000; there remain loading for that destination 47,000, against 51,000. Cleared for England since January 1, 261,000 bales, against 162,000; loading for do., 5000, against 6000; cleared for all other ports, 57,000, against 30,000; receipts at all ports since last cable, 13,000, against 11,000, and since January 1, 482,000, against 391,000 and 311,000. *Freight*, \$6, against \$5, and *Exchange*, six months' sight drafts, 3/6, against 3/5½.—*Ker & Co*, to Charles Nordhaus, 89 Water street, New York.

HOLLAND.

ROTTERDAM, October 3, 1888.—*Copper*.—In accordance with the plan of reorganization submitted to the shareholders at the recent general meeting, the Peninsular Copper Company have been remodeled and a new company formed called the Consolidated Peninsular Copper Company, to be domiciled at Amsterdam, with a share capital of 7,000,000 guilders, 16,667 shares of 240 guilders and 25,000 at 120, to be offered for sale in Amsterdam, London, Paris and Berlin. *Tin*.—Following are the Netherlands statistics for September:

Banca.			
	1888.	1888.	1887.
	Aug. 31.	Sept. 30.	Sept. 30.
	Slabs.	Slabs.	Slabs.
Stock on warrants with the Netherlands Trading Company.....	20,108	32,700	28,490
Billiton stock here and at Amsterdam.....	13,468	18,662	17,012
Total.....	33,576	51,362	45,502
Banca deliveries in September.....	11,746	9,325	11,071
Billiton deliveries in September.....	8,375	5,650	5,221
Total.....	20,121	14,975	16,292
Banca deliveries since January 1.	92,592	101,917	107,672
Billiton deliveries since January 1.	59,186	64,836	70,758
Banca afloat.....	4,000	8,200	3,880
Company's Banca reserve for future auctions.....	126,928	113,361	60,855
Billiton afloat.....	46,000	31,500	35,961
Quotations:			
Banca, fl.....	58½	63¼	63½
Billiton, fl.....	57½	62¼	63½

Since the 1st inst. Banca has ruled at 63 guilders per 50 kg.—*Koch & Vlierboom*.

GERMANY.

HAMBURG, October 6, 1888.—*Iron*.—There has been a growing inquiry in Rhenish-Westphalia during the week for both Pig and Finished, giving rise to the impression that the paralysis is at an end. Several large orders for Spiegel have been executed for American account, one for 20 % Manganese for 10,000 tons, and one for 10 to 12 % for 5000 tons; negotiations are going on for additional lines for the same quarter. Although these Spiegel shipments to the United States do not yet come up to what they were in 1887, a continuation of them would probably cause an improvement. For the moment 10 to 12 % does not bring over 53. But for Luxembourg underselling German makers, other Pig Iron would be higher and brisier than it is. Siegen is selling Forge Pig at 47 @ 48. Foundry Pig has remained steady, and so have both Bessemer and Thomas; the latter more and more supersedes Bessemer. White Luxembourg may be quoted 37.50; Gray, 42; English, 42. The domestic demand for Finished is decidedly livelier, but there is no stir in the export trade. Hoop Iron sells with greater ease in the home market; Beams continue lively, and so do Boiler Plates; Thin Sheets are doing better. Steel works are busy throughout, and so are the Car works; the Wire branch is quiet and steady. The quotation for Merchant is 125 @ 127.50; Bessemer Steel Billets, 135; Steel Rails, 120; do. for mines, 115. Prospects for a renewal of the International Steel Rail Syndicate are the reverse of encouraging just at present. In Upper Silesia 28 furnaces are in blast, 23 for own use

and 5 operating for the general market, the weekly output being 8500 tons. Works generally are loaded down with orders, so that all Iron branches are in a flourishing condition, the chief demand for the export of Finished coming from Roumania, Bulgaria, Servia and Denmark. There are even orders from Russia. The demand extends to Wire Nails, owing to the activity in the building branch this fall. *Metals*.—Lead continues tending upward, Hartz Lead bringing 15 marks in this city. Both Copper and Spelter remain firm.—*Bor-senhalle*.

The Electric Light in the Navy.

The electric light has been very prominent during the recent British naval maneuvers, and although accounts somewhat differ as to its actual value, there can be no doubt that it is one of the indispensable adjuncts to a modern man-of-war. One of the English electrical journals, while on this subject, remarks that some complaints have been made that the lookout men are so dazzled by the beam that they are unable to keep as sharp a watch as is necessary in directions which are not at the moment illuminated. On the other hand, this dazzling effect was turned to a good use during the naval maneuvers of last year, when the gunners manning the guns in the Pembroke Dock forts were rendered almost blind every now and again by the attacking ships skillfully flashing the light full in their faces, and during the interval of darkness moving rapidly to another point. This year Admiral Tryon made clever use of the electric light in a manner which recalls a somewhat similar use made by the French in their attack on Sfax. Unable to approach the forts near enough to deliver an effective fire, the French admiral placed his Hotchkiss quick-firing shell-guns on board his small boats, and as soon as it was dark sent them to attack the enemy at close quarters. He then threw the strongest possible light upon the forts, and the small boats, moving ahead in the darkness just beyond the flashes of light, came in close to the forts and poured in a deadly fire. The defenders, completely bewildered, capitulated soon after daylight.

A Hydrostatic Balance.—A hydrostatic balance, invented by Mr. John Joly, was exhibited at the recent meeting of the British Association. In a case about a foot high there is suspended a brass ball containing water, inside which floats a smaller ball. From this latter a wire passes through a nozzle in the outer vessel down to two scale pans, arranged one above the other. One scale pan would, of course, suffice. The balance weighs any quantity up to 164 grams accurately to within 1 or 2 mg. It can be made very cheaply and is independent of temperature and consequent expansion unless water be placed in the ball and air admitted. To prevent this a small chamber is placed round the nozzle through which the wire passes, into which dips a little stem from the sphere. This arrangement resembles a U with one very narrow and one wide limb, the latter one corresponding to the orifice in the vessel through which the wire passes, and the displacement would first occur in the finer tube. The surface tension of the liquid prevents any direct leakage of water. If perfect compensation be aimed at the outside vessel might be made of tin, the inside of iron. The hope was expressed that accurate and large balances will be made at a very small cost on this principle.

Engineering News has just published the first of a series of statistical reports on the water works of the United States, beginning with New England. The States in that group have 287 water works, with 5291 miles of mains, the capital invested being \$84,993,000.

Hardware.

There is little change in the situation, prices remaining without alteration and the demand being fair. The complaints that trade is in a measure disappointing are made in some quarters, but the volume of business is generally regarded as pretty satisfactory.

Barb Wire.

The market is not characterized by special strength, and business is moderate in volume. Carload lots of Four-Point Galvanized are quoted here at 3.6 cents, with the usual advance for small lots.

Cut Nails.

The market is quiet, with a moderate amount of business doing. Prices continue unchanged at \$1.85 for carload lots of Iron Nails on dock, and \$1.90 @ \$1.95 for small lots from store.

Wire Nails.

The condition of the market in this line is regarded as exceptionally satisfactory, the Western Association having completed its organization, with provisions to secure the maintenance of prices, and including as it now does all the leading Western manufacturers. At the meeting of the Eastern Association, held last week, the matter of an advance in prices was broached and suggested to the Western Association, but the result of the action remains to be seen. Quotations remain \$2.55 for carload lots and \$2.65 for small lots, and those quotations are held with regularity, except that in a few instances slight concessions are made beyond the prices given for small lots. The exceptionally large stocks of Nails held by the trade have some influence in the market, as the Nails can in many cases be bought from second hands at lower figures than from the manufacturers.

Miscellaneous Prices.

The price of both Manila and Sisal Rope remains without change. The fact that the Hemp of both kinds is firm in price gives a strength to the manufactured product, and it is thought not unlikely that an advance will soon be made.

The prices for Market Wire remain unchanged except that some exceptionally low quotations are no longer within the reach of buyers. The demand is referred to as light.

W. G. Avery Mfg. Company, Cleveland, Ohio, quote their Combined Saw-Set and Punch, their Bevel and Square and their Bevel Protractor Square at discount 40 per cent.

Trade Topics.

From a well-known Hardwareman in Texas we have the following incident, which was suggested by a recent article in this paper:

Referring to the article in your issue, 27th of September, on the art of selling, it reminded me that one time I was selling a small boy a 10-cent Pocket Knife. I was alone in the store at the time, when a man came in and wanted to buy a Wagon worth \$80. I invited him to take a seat until I was through with the boy. He remarked that if I would not drop a 10-cent sale to sell him a Wagon he would go elsewhere. I called his attention to the fact that at one time he was a small boy, and probably a 10-cent Knife was as much to him then as the Wagon now. He quickly and quietly took a seat until the boy bought the Knife and was gone. I was then at his service, and in a short time sold him the Wagon, and he left in a happy mood.

Our advices from Louisville, under date of the 13th inst., are as follows:

The Hardware trade of Louisville, Ky., has been good but quiet, a fair volume having been transacted. The Southern trade is still terribly depressed, with a few straggling orders coming from the unfortunate sections. Many salesmen have gone into the Southwest with

the idea of working back through the infected districts after frost makes its appearance. Bar Iron is in fair demand and holding firm at \$1.75 from store. Light Sheet is very scarce and sells readily at \$3.50 for No. 27 in jobbing lots. This advance is caused by the inability of the mills to fill orders. No one would have supposed that there were too few Sheet mills in the country, but such seems to be the case. For No. 27 there never was such a pressing demand on the jobbers, who, in turn, are urgent for prompt shipments from the mills, yet meeting with very little success; stocks are almost completely exhausted. Wire Nails are holding firm, a new advance having been ordered by the association. Dealers are getting suspicious of the danger line being reached, and a break resulting. The demand, although fair, will not stand much further tension. Cut Nails have again dropped. The action of the mills in association does more harm than good; they meet and resolve to sell only at certain prices and entice dealers to buy heavily, when down drops the bottom, and all confidence is destroyed. History repeats itself very fast in this instance. The Axle manufacturers have resolved that orders are getting scarce, and are throwing out fresh inducements to their friends, the big jobbers.

Items.

Freeman Wire Company, St. Louis, Mo., have in the hands of the printer a handsome catalogue, which will contain copious illustrations of the different styles of specialties which they are manufacturing.

Wells Bros. & Co., Greenfield, Mass., issue a supplement to their catalogue, in which descriptions are given of their Little Giant Combined Drill Holder and Countersink, their Farriers' Tool Box and Vise Bolt Grip and Wheel-Holding Attachment.

The Phoenix Wire Works, Detroit, Mich., are issuing their autumn catalogue, which shows a varied line of Counter and Office Railings, Iron Crestings or Roof Railings, Wire-Cloth Flower Stands, Screens, Nettings and miscellaneous goods.

The Meriam & Morgan Paraffine Company, Cleveland, Ohio, issue a price list relating to their manufactures, including, among other things, the Paragon Axle Grease.

By the special notice on page 51 it will be seen that Haydock & Bissell will sell at auction at the store, No. 86 John street, New York, the entire stock of the Benton & King Company on Wednesday and Thursday of next week. The sale will comprise in part an assortment of machinists' Bolts and Nuts, Brass Valves, Steam and Service Cocks, Gas Fitters' Tools, &c., and general Engineer's Supplies. Further particulars may be learned from the advertisement.

The Goulds Mfg. Company, Seneca Falls, N. Y., announce that Chaales L. Zacharie, who has been with them for many years, will hereafter be associated in the management of their salesroom at 60 Barclay street, New York.

Horton Mfg. Company, Fort Wayne, Ind., issue an effective advertising hanger, illustrating their Western Washer in attractive style.

Dightson & Co., wholesale and retail hardware merchants, at West Superior, Wis., are reported to have made an assignment for the benefit of their creditors on the 11th inst. Their assets are reported at \$20,000 and liabilities at \$35,000. Among their creditors are firms at Chicago, Milwaukee and Detroit.

In calling attention to their Standard Reference Disks the Brown & Sharpe Mfg. Company, Providence, R. I., send out not only a circular in which the goods are described and prices given, but they also issue a miniature pamphlet in which the characteristics and advantages of the Standard Reference Disks are pointed out. These pamphlets are evidently intended for distribution among mechanics who have use for the goods, and we call special attention to this method of bringing them

to their attention, as it may suggest to other manufacturers the adoption of similar expedient. We reproduce below one of the pages full size:

When a Gauge or Caliper has been long in use, the question arises whether constant service has impaired its accuracy. In deciding this question, Standard Reference Disks are of use. They are also useful for other

It will be conceded that the use of such advertising matter tastefully and judiciously gotten up and well distributed, would be an important aid to the retail merchants in effecting sales for Hardware. In cases where this simple expedient is resorted to it has been, we believe, attended with the best success.

Our readers will observe the advertisement of the Henry C. Hart Mfg. Company, Detroit, Mich., page 52, referring to their specialties for the Toy trade, including a line of Toy Banks, one of which is illustrated and the names of others given. All of these Banks are stated to have Combination Locks except the Cash Register Bank, of which we recently gave a description.

Brooklyn Wire Nail Company, 17 Broadway, New York, have prepared a unique and interesting Lead Pencil, which they are sending out to their customers. It is in the form of a finely finished 20-penny Wire Nail.

The Harrington & King Perforating Company, 224 and 226 North Union street, Chicago, received a letter on the 13th inst., mailed on the 1st of August, from a correspondent in Loeboc Samperie, Padang, Sumatra, West, Dutch East Indies, giving them quite a large order for perforated metals for separating coffee. The correspondent also ordered some general coffee machinery and a number of articles in the line of general hardware. He stated that he had seen the advertisements of these articles in *The Iron Age*, to which he was also indebted for much information about machinery. The letter also said that the planters of that district preferred to patronize American manufacturers, finding them usually very reliable and their goods and machinery of high quality, which could not be said for the manufacturers of other countries. In shipping these goods the route followed is via New York, Amsterdam, and the Suez Canal, by the Netherland Steamship Company. The Harrington & King Perforating Company inform us that they have a very large foreign trade in their perforated metals, which is traceable to a considerable extent to their advertisements in *The Iron Age*.

Result of the Cipher Competition.

There were 91 lists of ten-letter words received in the David Williams cipher competition. Of these 88 were received before the hour fixed for closing the contest, while 3 were received after that hour. The longest list was sent in by C. F. Rood, of Grand Rapids, Mich., aggregating by actual count 1158 words. This was reduced by the Committee of Award to 1065. The second longest list came from A. Israel, of Buffalo, N. Y., being by count 1146 words, which the scrutiny of the committee reduced to 996. The third list came from Sam Holder, of Bloomington, Ill., counting 1082 words, but being similarly reduced by the examination of the Committee to 974 words.

The prizes, therefore, by the terms of the contest go as follows: First prize, \$15, to C. F. Rood, of Grand Rapids, Mich.; second prize, \$10, to A. Israel, of Buffalo, N. Y. In view of the close competition between the last two competitors named, it has been decided to add another prize, and therefore the third prize of \$10 is awarded to Sam Holder, of Bloomington, Ill.

The three contestants named above, as will be seen by the list published below, distanced all their competitors, the next highest lists being in the eight hundreds. In the list of contestants we indicate the order in which the papers were opened by the committee, and append the number of words sent in by each, by actual count. It will be noticed that the number of lists ranging from 500 to 700 words is far the larger number. This, we think, will be a surprise to the reader, for very few, we imagine, who have not given personal examination to the subject, would suppose there were even 300 words of the kind specified in the contest. A number of ladies, wives and daughters of subscribers took part in the contest. The geographical distribution of the names, it will be observed, is very general, a very large proportion of the United States being covered, as well as Canada. The following is the list of names and addresses of the competitors, initials or *nom de plumes* being inserted in cases where we have been requested not to publish the names:

LIST OF CIPHER COMPETITORS.

1 "C. S. C.," Oakdale, Neb.....	823
2 J. H. Robbins, Keokuk, Iowa.....	667
3 A. Israel, Buffalo, N. Y.....	1146
4 Geo. H. A. Water, Renova, Pa.....	485
6 A. A. Whitenack, Somerville, N. J.....	617
7 C. F. Rood, Grand Rapids, Mich.....	1153
8 Fred. N. Parks, Norwich, N. Y.....	628
9 Sam Holder, Bloomington, Ill.....	1082
10 W. R. Tilton, Prairie Depot.....	122
11 Mrs. Gerrit Smith, Wellsburg, W. Va.....	127
12 William Smith, Ontario, Can.....	314
13 S. A. Partridge, Mobile, Ala.....	322
14 "B. H. L.," Creston, Iowa.....	664
15 Jos. E. Anderson, Alliance, Neb.....	585
16 Geo. H. Ferris, Hicksville, Ohio.....	652
17 Charles E. Bodley, Creston, Iowa.....	650
18 J. Q. Donald, Lowndesville, S. C.....	113
19 E. W. Porter, Chambers st., N. Y.....	130
20 F. W. Burnham, Hartford, Conn.....	313
21 Frank Sausser, Anderson, Ind.....	166
22 Emma Gruber, Oshkosh, Wis.....	300
23 J. T. Norton, Winsted, Conn.....	225
24 Theo. W. Budelmann, Brooklyn.....	300
25 C. E. Montgomery, Hoxie, Kan.....	881
26 D. S. Gardner, Youngstown, Ohio.....	731
27 "W. L. E.," Petersburg, Ill.....	113
28 John L. Kerr, Montreal, Can.....	200
29 Alphonso Smith, Milford, Conn.....	627
30 F. Kansteiner, Hannibal, Md.....	46
31 R. F. Richards, Chambers st., N. Y. City.....	658
32 Mrs. A. K. F. McGibbon, Susquehanna, Pa.....	112
33 "M. E. J.," Baltimore, Md.....	101
34 E. S. Bond, Florence, Mass.....	803
35 "J. T. B.," Albany, N. Y.....	678
36 Miss Ollie Car, Chicago, Ill.....	667
37 Henry C. Wing, Greenfield, Mass.....	213
38 Murrel De France, Willsburg, W. Virginia.....	41
39 E. S. Ramsey, Colby, Kan.....	104
40 O. C. Marsh, Greenwich, Ohio.....	738
41 J. R. Vincenty, Syracuse, N. Y.....	782
42 "Bill J. Pie," Bristolville, Ohio.....	735
43 "W. K.," Johnstown, Pa.....	184
44 Otto Praeger, San Antonio, Tex.....	263

45 Otto C. Ahlers, Bellevue, Iowa.....	129
46 Charles Griebeling, Newton, Iowa.....	276
47 "R. C.," Buffalo, N. Y.....	745
48 T. A. High, Havana, Ill.....	168
49 David R. Williams, Mobile, Ala.....	124
50 Walter W. Bennett, Gananoque, Canada.....	58
51 "P. L. R.," Philadelphia, Pa.....	164
52 "A. F. S.," Keokuk, Iowa.....	669
53 J. C. Bold, Glasgow, Ky.....	259
54 W. J. Beckley, Ravenna, Ohio.....	82
55 T. H. Davis, Davenport, Iowa.....	688
56 O. P. Wheeler, Buffalo, N. Y.....	317
57 E. C. George, Plymouth, N. H.....	163
58 Joe Young, Bellevue, Pa.....	101
59 R. E. Mallory, Attica, Ohio.....	43
60 T. E. Enos, Waverly, N. Y.....	20
61 J. C. Barnes, Strawberry Point, Ia.....	345
62 "K. W. J.," Philadelphia, Pa.....	48
63 I. F. Moore, Bridgeport, Conn.....	557
64 F. A. Smith, Flora, Ind.....	231
65 J. C. LeBean, Grand Forks, D. T.....	127
66 "Retail Hardware," Phila., Pa.....	324
67 L. Daniel Mehrling, Littlestown, Pa.....	523
68 H. A. Uehren, Galena, Ill.....	240
69 "K. E. G.," Norcross, Ga.....	374
70 "B. E. A.," Eufaula, Ala.....	636
71 C. A. Marker, Birmingham, Ala.....	556
72 Charles W. Brown, South Fifth avenue, New York.....	43
73 Jos. M. Ellis, Dallas, Tex.....	131
74 G. W. Battle, Jr., Norfolk, Va.....	362
75 W. N. Badger, Burlington, Vt.....	546
76 H. H. Swink, Temple, Tex.....	724
77 W. H. Elliott, Chicago, Ill.....	551
78 "H. D. E.," Malone, N. Y.....	182
79 Henry W. Moyer, Campden, Ont.....	552
80 Mary Slifer, Tarrytown, Md.....	504
81 Linda M. Bogardus, Mt. Vernon, O.....	570
82 John Lehr, Cleveland, Ohio.....	660
83 James Holden, Scranton, Pa.....	150
84 J. A. Pitkin, Kalamazoo, Mich.....	625
85 William Uhle, Cleveland, Ohio.....	607
86 Pauline Orrick, Canton, Miss.....	536
87 Madeline Orrick, ".....	514
88 Mrs. C. H. Dickinson, Kalamazoo, Mich.....	635

The following came to hand after the closing hour:

89 H. V. Jones, Newtonville, Mass.....	682
90 "D. C.," Johnstown, Pa.....	134
91 George W. Trout, Maquoketa, Iowa.....	719

Sargent & Co.,

New York and New Haven, Conn., issue a neat catalogue devoted to Carriage and Harness Hardware, in which 40 pages are used in exhibiting this line. It is accompanied by the following discount sheet, which is subject to an extra discount of 10 per cent. for prompt cash:

	Discount Per Cent.
Harness Hooks.....	60
Store Rack Hooks.....	60
Baggage or Harness Hooks.....	60
Hitching Rings.....	60%
Hitching Hooks and Rings.....	60%
Hitching Post Caps.....	60
Hitching Post Rods.....	65
Rein Chains.....	60%
Breast Chains.....	60%
Halter Chains.....	60%
Hitching Chains.....	60%
Shaw Patent Slide-Lock Snaps.....	65
Patent Double-Lock Snaps.....	65
German Pattern Snaps.....	60%
Sargent's Patent Snaps.....	70&10
Cock-Eye Snaps.....	70
Covered Spring Snaps.....	60&10
Covered Spring Snaps (Change list of No. 161 to \$14).....	60&10
Open Spring Snaps.....	60&10
Cattle Ties, Nos. 5 and 1.....	60
No. 4.....	60%
Halter Trimmings or Cattle Ties.....	60%
Rope Halter Leads.....	55
Rope Horse and Cattle Ties.....	55
Hitching Halters.....	55
Bull Rings, Nos. 10 to 22.....	60%
No. 25.....	60
Bull Snaps.....	60%
Cattle Leaders.....	60%
Ox Bow Pins, Nos. 71 and 72.....	60
No. 82.....	60%
White Metal Mane Combs.....	50
Carriage Knobs.....	60
Sheep and Cow Bells.....	60
Cow Bells, Kentucky and Western.....	70
Brass Ox Balls.....	55
Prize Ox Balls (Bronze Metal).....	55
Carriage Makers' Clamps.....	70
Cabinet Makers'.....	60%
Bench Vises.....	60&10
Swivel Bench Vises.....	60&10
Applet's Washer Cutters.....	60

Saddlers' Punches.....	55
Spring Punches.....	50
Empire Lace Cutters.....	33%
Shoe Knives.....	25
Harness Rings.....	40
Cock Eyes.....	40&5
Triple Tongue Chime Bells.....	40&5
Tinned Rivets and Burs.....	40&7 1/2
Copper.....	40&7 1/2
Rivet Sets.....	50
Lining Nails, Japanned.....	35
" " Silvered.....	45
No. 1, Saddle Nails, Japanned.....	30
No. 1, " " Silvered.....	40
Furniture Nails.....	20
China Nails and Disks.....	40&7 1/2
Gaston's Prestoline.....	50
German Coil Chain.....	55
" " Cow Ties.....	40
" " Halter Chains.....	55
Maydole's Farriers' Hammers.....	10%
Heller & Bros' Farriers' Hammers.....	33%
Heller's Horse Rasps.....	50
Nicholson's Horse Rasps.....	60
Martin's Horse Clippers.....	25
Wostenholm's Farriers' Knives.....	Net
Blacksmiths' Butterises.....	75
Hoof Nippers.....	60
Horse Shoeing Pincers, No. 52.....	60&10
" " " No. 62.....	60&10
" " " No. 72.....	60
Blacksmiths' Tongs.....	75
Curry Combs.....	55
Perfect Curry Combs.....	40&7 1/2
Rubber.....	20
Horse Cards.....	10

Ladd's Discount Book is also effectively represented, and the manner of its use and its advantages indicated.

Recent Exports.

PER SHIP ELBE, SEPTEMBER 28, 1888, for MELBOURNE, AUSTRALIA.

By Woodhouse & Stortz.—12 cases Hardware, 8 Stoves, 526 pounds Shade Rollers.
By Hsley, Doubleday & Co.—33 1/2 gross Axle Grease.
By S. H. Payne.—3500 pounds Plated Ware.
By Lazarus & Rosenfield.—20 cases Clocks.
By F. Kroeber Clock Company.—1 box Clocks.
By Arnold, Cheney & Co.—12 cases Iron Castings, 4 cases Forks, 7 cases Axles, 20 cases Children's Wagons, 4 cases Spokes, 2 cases Spokes, 4400 pounds Axles, 2 cases Plows.
By Healy & Earl.—6 packages Forges, 17 cases Woodworking Machinery, 2 Iron Safes, 10 packages Forges, 2 cases Saw Mills, 1 box Belt Hooks, 1 case Woodworking Machinery, 3 cases Sandpaper.
By Rand Drill Company.—1120 pounds Drills, 5910 pounds Air Compressor and Parts.
By H. W. Peabody & Co.—44,800 pounds Barb Wire.
By Arkell & Douglas.—3 dozen Razors, 10 dozen Axes, 6 dozen Shovels, 6 crates Traps, 3 dozen Toys, 1 dozen Wringers, 7 dozen Roller Skates, 5 dozen Wall Brackets, 5 1/2 gross Fruit Jars, 9 dozen Hammers, 1 gross Glue, 4 dozen Planes, 20 1/2 dozen Saws, 3 dozen pairs Roller Skates, 601 pounds Brackets, 975 pounds Hardware.
By R. W. Forbes & Son.—10 dozen Axes, 14 packages Hardware, 31 packages Hardware, 3 dozen Fork Handles, 25 1/2 dozen Axes, 26 packages Hardware, 1/2 dozen Hardware, 998 pounds Carriage Bolts, 30 packages Hardware, 24 dozen Hatchets, 36 dozen Sledge Handles, 6 packages Plated-ware, 3180 pounds Carriage Bolts, 5 dozen Wringers, 6 dozen Egg Beaters, 23 packages Stoves, 1 case Hardware, 33 Bolt Clippers, 24 dozen Axes, 1 dozen Hay Knives, 8 dozen Wringers, 16 packages Stoves, 1200 Carriage Bolts, 3 sets Wheels, 8 boxes Hardware, 143 pounds Rivets, 1 case Bicycles, 280 pounds Nails.
By Coombs, Crosby & Eddy.—42 dozen Edge Tools, 1500 Bolts, 20 dozen Handles, 21 dozen Edge Tools, 10 dozen Hardware, 2 gross Glue, 5 gross Tools, 25 dozen Hardware, 1 gross Clothes Pins, 500 Broom Handles, 3 dozen Handles, 3 Pumps, 168 pounds Nails, 3 Meat Presses, 4 Lamps, 3 dozen Traps, 29 dozen House-Furnishing Goods.
By W. H. Crossman & Bro.—12 dozen Curry Combs, 1/2 dozen Sausage Stuffers, 1 1/2 dozen Wagon Jacks, 13 dozen Scroll Saws, 20 dozen Washboards, 22 dozen Wrenches, 3 dozen Tills, 1-6 dozen Store Trucks, 41 dozen Meat Cutters, 5 1-6 dozen Bird Cages, 1 dozen Wood Scoops, 3 dozen Churns, 12 dozen Mouse Traps, 12 dozen Vises, 3 dozen Scroll Saws, 6 dozen Bench Screws, 1 dozen Oil Stoves, 5 gross Blacking, 1 dozen Sinks, 24 1/2 dozen Pulley Blocks, 4 1/2 gross Axle Grease, 3360 pounds Axle Grease, 2900 pounds Nails, 5000 Paper Shells, 11 cases Cartridges, 292 pairs Roller Skates, 1 Crate Washers, 11,200 pounds Barb Wire, 18 dozen Razor Strops, 43 dozen Axes, 30 dozen Hatchets, 12 cases Carpenters' Tools, 7 cases Hardware, 32 packages Hardware, 54 dozen Handles, 1750 feet Chain, 7 packages Pumps, 3 dozen Wrenches, 1006 pounds Packing, 66 packages Carriage Hardware, 30 dozen Axes, 1/2 dozen Folding Beds, 1 case Hardware, 14 dozen Picks, 8 dozen Axes, 1/2 dozen

Washers, 20 dozen Axes, 1½ dozen Wringers, 40 boxes Clothes Pins, 52 Axes, 12 dozen Hatchets, 30 dozen Shovels, ½ dozen Mangles, 1 case Tools, 1803 pounds Hardware, 1 crate Washers, 4 packages Tools, 43 dozen Wrenches.

By *H. W. Peabody & Co.*—10 packages Agricultural Implements, 14 packages Typewriters, 15,000 pounds Handles, 72,000 feet fuse, 62 packages Grease.

By *H. Behr & Co.*—4 cases Sandpaper.

By *Strong & Trowbridge.*—9 cases Cartridges and Shells.

By *Welsh & Lea.*—26 cases Hardware, 4 cases Saws.

By *Meriden Britannia Company.*—18 packages Plated-Ware.

By *Morris, Strouse & Co.*—21 dozen Hand-saws, 10 dozen Plumbs and Levels, 6 gross Forks, 1 gross Mop Sticks, 45 dozen Mouse Traps, 3 gross Tools, 48 dozen Gate Hinges, 2 gross Liquid Glue, 24 dozen Hammers, 18 gross Hat and Coat Hooks, 3 gross Sad Irons.

By *Seth Thomas Clock Company.*—65 boxes Clocks.

By *A. S. Lascelles & Co.*—100 cases Slates, 10 cases Handles.

By *S. Halsey & Son.*—110 pounds Hardware.

By *Thompson, Bedford & Co.*—1 case Plated-Ware.

By *Strong & Trowbridge.*—3 cases Carriage Hardware, 5 cases Broom Handles, 30 dozen Axes.

By *Ansonia Clock Company.*—66 boxes Clocks.

By *W. K. Freeman.*—242 pounds Horse Nails, 6 boxes Hardware.

By *R. Irwin & Co.*—2 cases Hardware.

By *A. Field & Co.*—24 dozen Carriage Ironwork, 9000 pounds Tire Bolts, 3 cases Carriage Ironwork, 45 Axes, 6 sets Axes, 16 sets Wheels, 450 dozen Whip Handles, 40 dozen Harness Trimmings.

By *Crane & McMahon.*—20 cases Carriage Ware, 101 packages Carriage Ware, 25 cases Carriage Ware.

By *E. Miller & Co.*—19 boxes Lamp Goods, 4 packages Lamp Goods.

By *Welsh & Lea.*—5 cases Iron Bolts, 50 boxes Clothes Pins, 9 packages Hardware, 5 cases Shovels.

By *Russell & Erwin Mfg. Company.*—5 cases Hardware.

By *McLean Bros. & Rigg.*—1900 pounds Nails, 160,000 Rivets, 20 dozen Axes, 26 dozen Brackets, 19 dozen Clocks, 4 dozen Lamp-ware, 9 boxes Castings, 5 cases Tacks, 2 crates Tills, 56 pounds Oil Stones, 24 dozen Fly Traps, 18 dozen Scales, 34 dozen Saw Sets, 24 Vises, 24 dozen Hammers, 2 dozen Grindstones, 12 dozen Braces, 10 Bench Screws, &c., 31 Stoves, 13½ dozen Shoe Brushes, 895 Staves, 101 dozen Sporting Goods, 3 dozen Pick Handles, 3 dozen Mop Heads, 84 dozen Axe Handles.

By *W. R. Cameron & Co.*—5 cases Sand Paper, 1 case Machinery, 21 cases Iron Bolts, 14 cases Meat Choppers, 125 cases Axes, 2 cases Bolts, 21 cases Castings, 5 cases Springs, 14 cases Bolts, 83 cases Handles, 1 box Castings, 2 cases Sand Paper, 1 case Hardware, 2 cases Hat Racks, 1 case Grease, 5 cases Hardware, 2 cases Wagons, 48 cases Trucks, 1 case Brushes, 6 bundles Handles, 5 cases Wheels, 1 box Children's Wagons, 3 cases Hardware, 9 cases Wagons, 39 cases Shoe Nails, 1 case Tools, 5 cases Blacking, 20 barrels Blacking, 1 case Shoe Knives, 104 cases Handles, 110,000 pieces Slate, 21 dozen Shovels, 35 cases Edge Tools, 7 cases Shovels.

American Hardware in the Australasian Colonies.

The following is a continuation of the article in the Australasian *Ironmonger*, from which we gave an extract in our last issue. It is of interest as relating to the position held by American Hardware in the Australasian Colonies:

NEW ZEALAND.

General Hardware.—The Lock trade, in which America had the run of this market for cheap Locks, has, to a large extent, failed them recently, owing to English makers bringing out Locks in wrought metal as cheap as the American in cast. This result has, however, been attained by English makers, to a large extent, copying American patterns and style. The packing of the American Lock, however, still remains superior. In light castings Kenricks have taken a large portion of the trade the Americans once had. In light edge tools the Yankee is not holding his own; the English makers have improved the finish of their tools and are quoting lower prices. In carpenters' Braces, special wood-working tools, and carpenters' Hammers, however, the American makers are quite holding their own. In Axes, also, the American is pre-eminent; nothing can touch the productions of the Douglas Axe Company, or those of the Francis Axe

Company. Oliver Ames Corporation also sweeps the board nearly so far as Shovels are concerned, although Sheffield is and probably will increasingly push into a share of this trade. In Lamps America is again coming to the front, especially in force draft and circular wick with central draft. In Electro-Plated Ware American travelers are offering patterns which come nearer to English ideas of chaste beauty, and there still continues to be a fair demand for the showy striking designs they have for some time been noted for. In Hay Forks the English makers are picking up more of the American ideas, and are putting them in at cheap rates. In all kinds of Handles, however, the American timber has all its own way. Barb Wire is nearly out of the market; a little of Johnstone, however, is coming forward, but the freight kills it. In Cotton Duck, until recently, all has come from America, but recently Heavy Cotton Duck and Canvas have been obtained from England at prices slightly over the American, but the quality is improving every shipment. In Kerosene, Turps., Rosin, none but American is on this market. Although outside the trade it might be mentioned that large quantities of Sausage Casings and Clover Seeds are imported from America.

In the ironmonger's trade it is estimated that American goods represent from 15 to 20 per cent. of the whole. The following are, at all events, the principal items in this line: Axes, Picks, Shovels (no Spades), Hay Rakes, Hay Forks, Scythe-Handles (but few, if any Scythes), Garden Rakes and Hoes, Wash-boards, Tubs, Hammers and Chisels (a few, but the bulk come from England), Locks, Scales and Weighing Machines, Stoves. Of Saws, the Hand-Saws are mostly from America, and Circular Saws chiefly from England. Then there are Churns, Carriage Woodware, Barb Wire, Smallware (such as Apple Parers, Egg-Beaters, &c.), Lawn Mowers. In Agricultural Machinery, Hornsby's Reapers and Binders take the lead, and the Buckeye Mowing Machines and Reapers and Binders are also favorites.

We have on a former occasion remarked upon American garden tools, such as Rakes, Hoes and Lawn Mowers, as being much lighter and better balanced than the old English types, and the same thing may be said of other similar goods. The representatives of English manufacturers are beginning to visit these colonies more frequently than they used to do, and they can easily ascertain and judge for themselves the extent of trade which they are likely to lose. Every year these markets will be extending in importance and British manufacturers can easily, if they think it worth while, retain the trade, as some importing houses find it easier, through their more settled connections and channels, to obtain goods from England than from America. An effective effort in this direction has already been made by certain Lock-makers, with satisfactory results.

Boring Implements, which include a large variety of tools, are well supplied by several firms. In this respect perhaps the Millers Falls Company deserve first place for "Barber" Bit Braces, Ratchet Braces, Breast Drills, &c.; then comes W. A. Ives, for excellence in Hollow Augers, Expansion Center Bits, &c. Cook's Auger Bits are being favorably known, but have had to give place latterly to Gilpin's English make. For jobbers' and machinists' Drills the Morse Twist-Drill Machine Company stand high.

Chisels, Gouges, &c.—For a long time the American Socket and Socket-Firmer Chisels and Gouges held a high place in the esteem of the colonial workmen, but for some reason the sale, to a great extent, has fallen off, and the English makers still hold sway in this line.

Forks.—When Sluice Forks were largely required the names of Sheble & Fisher and Tuttle were to the miner guarantees of a good article, but hydraulic sluicing has driven this tool from the market. American Hay, Manure and Spading Forks hold their own against English manufacturers, though the Hay Forks are in danger of being squeezed out by the great English makers.

Hammers.—In all kinds of bench and artisans' Hammers the Henry Cheney Hammer Company were the first to present us with a perfect article, and they have deservedly obtained a large trade. They still hold the position, but the English makers, Spear & Jackson, are treading fast on their heels.

Hones.—All the finer kinds of stone used for sharpening good tools are supplied from America, among which are Arkansas, Washita, Indian Ponds, &c.

Planes.—We have to thank the Stanley Rule and Level Company for the introduction of these combinations known as Iron Block Planes, the Bailey Adjustable Plow, &c.

Picks.—Some 15 or 20 years ago it was almost impossible to sell any other than a Collins' Pick. At the present time it is difficult to

get cost price for them. They have been superseded by several English makers, notably Edwards, Holt, Richards. The principal reason for this is to be found in the pattern; English makers put more strength in theirs.

Plumbs and Levels of all styles and sizes for the use of carpenters, bricklayers, engineers, surveyors and others, this company's goods are ahead.

Saws.—Among American makers in this line Henry Diston & Sons, Keystone Works, Philadelphia, stand pre-eminent. From the list of Hand Saws we select Nos. 7, 76 and D8 as being the most popular: from Cross-cuts, the Great American and Drag-Tooth. In Mill Saws the English makers, Wheatman & Smith and Spear & Jackson, dispute the ground, especially the latter, whose make is said to be very reliable.

Shovels.—Of long standing in the public estimation, especially in that of contractors, mining companies, &c., is the Shovel known as O. Ames. No tool has had so firm a hold of the market, and retained it for such a period, as Ames' No. 3 L.H.R.P. Shovel, and in saying this we may be quite sure it is because it has been the best. Both the miner and contractor have long ago indorsed that verdict. When it comes to a D or Crutch-Handle Shovel (the latter is seldom used), the Americans are out of it. In coal mines and on railways the English maker gets a chance.

Spades.—The American article has never taken anything like first place in this market, being too light and flimsy for a new country, where stumps and roots are so frequently encountered; the English make are much stronger.

Locks.—So many new departures from the old stereotyped form and patterns of the Old World have been taken by the Americans that it is difficult to say which is the most startling; but certainly the Lock trade in that country has grown into an industry marked by astonishing novelty and ingenuity, and in the building up of this trade light castings have been a surprising factor, enabling the maker to place a neat, handy and cleverly constructed Lock on the market at prices never heard of. The best-known makers here are the Russell & Erwin Mfg. Co. and Sargent & Co. for House Locks, and the Yale Mfg. Company for the finer kinds.

Nails.—Time was when we obtained from America the bulk of the Cut Nails we built our wooden houses with, but that is a long time ago. The Wire Nails from the Continent of Europe have squeezed them out; we still import from there some lighter kinds, such as Finishing Brads, Hungarian Boot Nails, &c., while American Horse Nails have entirely obliterated the English and Scotch makes, and the Putnam Horse Nail is a "household word" in every smith's shop in the colony.

Castings.—The thousands of uses that Light Iron Castings have been put to by the American manufacturers are a monument of their ability, ingenuity and skill. In this department America stands unrivalled. It would be quite useless to attempt to enumerate the goods made in this way, and for the same reason we can only mention a few manufacturers in this line. The most important industry under this heading, perhaps, is cooking and heating Stoves; the elegance of design arrived at by some makers is astonishing, when we take into account that utility must not only be preserved, but made more and more perfect. The highest class Stoves are seldom seen in this colony, because in our towns we mostly use English cooking Ranges, which are built in as fixtures.

Machinery.—In harvesting and field requirements the Reaper and Binder has played by far the most prominent part with us among American productions, the other leading lines calling for mention being few. Horse Rakes are perhaps the next in importance, and of these the Taylor and the Buckeye are best known. In Flows, the American-made that have come to hand are limited in number and not suitable. The English makers provided these for many years, but for a long time past colonial-made Flows have, in a great measure, put the imported ones out of the market. Lightning Hay Knives and American Scythe Snaths should here be noticed, especially the latter, as having completely superseded those crude, unhandy articles that English makers dispatched to the colonies in the early days of colonial history. In this connection, for small holdings and garden cultivation, the Planet Junior farm and garden implements are superseding the ordinary hand implements; their combined Drill Cultivator and Plow is a really useful line, as is also their No. 2 Seed Drill, and we may fairly look for a rapid extension of their use. This brings us to a notice of Lawn Mowers, the makers of which have been many and various. Among those the Philadelphia, the Excelsior and New Easy are the best in this market. Corn Shellers, among farm requi-

sites, should not be forgotten, although they have been patronized more, perhaps, by our Maori population than by the whites. Ames Plow Company are the most favored makers in this line, as also in Hand Corn Mills and Thermometer and other Butter Churns. There are very few dairies in this country where these goods are not well known and highly appreciated.

VICTORIA.

As the result of inquiries as to what extent American manufactures are being successfully introduced into this colony, I find that in some lines American manufacturers and merchants are pushing their trade in articles in which England formerly was supposed to excel beyond fear of competition. This applies more especially to Stoves, Locks, Lock Furniture, Bolts, Cutlery and Steelware; Axes are almost an American monopoly, as also Buggy and Wagon Woodware and Iron Fittings. Braces and Bits, Hammers, Joiners' Tools, and a large variety of Shelf Goods are also well stocked here.

The English wares are not being ousted because the American manufactures are in all cases better, but because the latter are, as a rule, pushed with more energy, system, and local adaptability. English manufacturers in the past have not been in the habit of studying the changes in the requirements of the market as their competitors have done, though lately there are signs that many makers are awakening both to their own interest and to the fact that the colonies require well-finished, low-priced, and suitable articles.

In *Electro-Plated Ware and Britannia Metal Goods* the Meriden Britannia Company, Reed & Barton, and Simpson, Hall, Miller & Co. are the principal firms doing business here. A good trade has lately been done by these firms in low-priced Cruets, Tea Sets, Spoons and Forks, Cake Baskets, Ice Pitchers, Card Receivers, Pickle Castors, &c., all of which are in good demand and meet with a ready sale.

In *Tools* an immense number of American firms are competing for a share of our imports. Among *Edge Tools* the American *Axe* is



Fig. 280.—Elevator Guides.

almost a monopoly in this market; the principal makers are the Douglas Axe Mfg. Company. General shelf goods, such as Locks, Butt Hinges, Flush Bolts and Rings, Barrel Bolts, Letter-Box Plates, Door Bell Handles, Sash Fasteners, Sheaves, Pulleys, Brackets, Lock Furniture and general Hardware, are largely imported, and in some lines, especially in Locks, are quite superseding English makers, as far as extensive sales are concerned. The American Lock commands the market through being lower-priced and more attractive, although where price is a secondary object for really first-class buildings the English make is generally adopted.

Cutlery.—The efforts made by American manufacturers of Cutlery to open a market here have been few and far between, and sufficient energy has not been shown in pushing a trade. Finding the competition very great in this class of goods, and not by any means an easy job to have it all their own way, they have neglected this for other markets, where a larger business can be done and better profits realized. An exception to the above is to be found in Butchers' Knives, which are highly appreciated and have a good sale. Razor Strops of all kinds are imported.

Stoves, Ranges, &c., have been well pushed here, Stoves especially being well stocked, but Ranges, perhaps because they are more distinctly English, are more scarce. The competition in this line has been very keen, with the result that some surprisingly economical Stoves have been devised to run the market.

Lamps of late years have undergone great improvements, and some beautiful designs have been introduced both in low priced and more expensive, but they are not nearly as plentiful here as one would expect.

Buggy and Wagon Woodware and Fittings.—Although the demand for this class of goods has fallen off considerably the last year or two, principally on account of the extension of the tramway system here, and consequently the fewer coaches, &c., required, there still has

been a fair amount of business transacted in these lines. American firms are not competing in Axes for Buggies, &c., with the English, who command the Australian trade, but are, nevertheless, largely sending here Nut and half Patent axes. American Varnishes only command a portion of the trade here; the gallon measure, being less than the English, is found to be very objectionable to the retailer.

Among what may be called miscellaneous imports I may mention Ice Chests, Wood Step-Ladders, Mouse Traps, &c., Bolt and Rivet

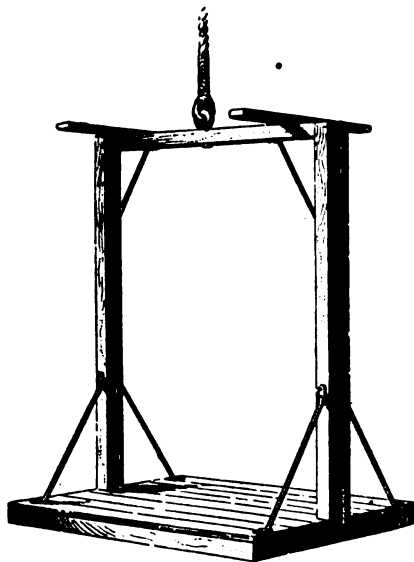


Fig. 281.—Elevator.

Clippers, Tacks, Sewing Machines, Scales and Weighbridges, Wire Goods, Sausage Machines, Washing Machines, Wringers, &c., Davis Swing Churn, Axe Handles, Axle Grease, Lubricating Oils, Paints, Kalsomine, &c., and Smiths' Forges. A special line which adorns the windows of most ironmongers are iron toys, consisting of Mechanical Money Banks made in attractive designs, Paper-Cap Pistols, &c.

Cartridges are freely imported, and the demand seems to be increasing of late.

Barb Wire is a line in which business is always doing; there is hardly a ship leaves

own way; but, among smaller field implements, there are many that are highly appreciated for their light and handy qualities. Among these are Horse Hoes, Spring-Tooth Harrows, Acme Pulverizing Harrow, Clod Crusher and Leveler, with Reversible Coulters, Winnowers, Seed Sowers and Threshing Machines. American Plows do not seem to take in Victoria, but the Plows of B. F. Avery & Sons are well known in Sydney. Other goods favorably known are Hay Forks and Windmills.

Agricultural Hand Implements, such as Shovels, Spades, Scoops, Rakes, Tine Hay Forks, &c., are well known here.

General Machinery and Engineers' Tools are frequently met with, yet they form a very inconsiderable item when compared with the imports from Great Britain. American Pumps and Hydraulic Machinery are better stocked.

Arrangement of Stores.

We have received from A. M. Smith, Pike, N. Y., the following description of his Elevator, which is illustrated in the accompanying cuts Figs. 280, 281, 282, 283 and 284. After alluding to his store as 28 x 62 feet and 12 feet between floors, which he refers to as sufficiently high for a village, Mr. Smith says:

When I was putting in my counters and shelving I began to think how I was going to get Sash, Doors, Blinds, Nails, Stoves, Grass Seed, Clover Seed, &c., up-stairs, since the main floor would be entirely inadequate. I then started for Buffalo to see what an Elevator could be obtained for. One house offered me the boat and gearing for a light one for \$175, and I was to furnish material and put it up, besides paying freight to Pike. This appeared rather expensive to one not acquainted with such a labor-saving machine. I then visited several stores and observed the manner in which Elevators were made and managed, and having got a few points settled I came home without having purchased. I then drew up my plan and set my carpenters to work in good earnest. I first took some gearing out of a Mowing Machine in the old iron; made a drum 3 feet long and a bull wheel 5 feet in diameter; made two stationary guides out of 2-inch hard wood, bolting them well

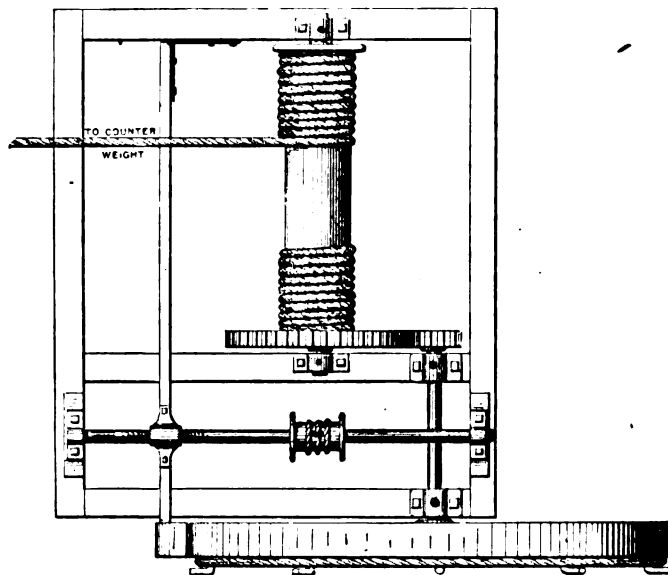


Fig. 282.—Plan of Hoisting Apparatus, Top View.

either Boston or New York for Australian ports without a greater or less number of reels.

Among *Agricultural Implements* and machinery of American manufacture the most prominent are, of course, the Reapers and Binders, in which an immense trade has been done here during the last few years. They form a leading feature at most of the agricultural societies' shows, and during harvesting operations it will be difficult to find a district in the colony where they are not to the fore. Portable Engines of American make are, I believe, unknown here, the numerous English manufacturers of the articles having it all their

together (Fig. 280). The middle piece was only 8 inches wide, while the outer ones were 4½ inches, leaving a groove 1½ inches deep for the boat to draw up and down in. To avoid friction I cut out the tongue on the boat all but about 1 foot on the top and bottom, as shown in Fig. 281, and then set in some sash rollers to keep it just as I wanted it. This was all done by hand, and under every disadvantage possible. I paid about \$4.50 for having the irons connected with it

made, making it sufficiently strong to carry a ton with safety. With reference to the brake, Figs. 283 and 284. In this I used an inch bench-screw welded to a long arm, and a drum made upon that for a rope to run over. One end of the brake was held by a strap hinge. This brake is on the bull wheel, and will stop and hold the boat with a full load with a single jerk of the rope. The rope goes over the drum on the brake three times, and a staple fastens it in the middle to prevent any slipping. This brake rope is $\frac{1}{4}$ -inch Manila, and goes over a pulley on the lower floor by a guide, so as to be always in place and in order. The arms to the boat, Fig. 282,

the thing, as it would either stop it or let it run too fast. Then I put a leather upon a trap spring so as to draw it by means of a rope against the under side of the bull wheel, an arrangement which worked satisfactorily. I could control the elevator at will, so that with Stoves on trucks a boy 8 years old can move the heaviest Range upstairs and down, and as the elevator also goes into the cellar it can be used for taking down Oil, &c., in barrels, and other heavy goods. Now, what will make all this interesting to some reader in some town who is still using a grab or chain, taking up Stoves or bags by hitching on, is the cheapness of it all. The

them from obtaining food and shelter. B. Brothers made complaint of this combination against them, and C. and others of the typographical union and the Knights of Labor, and they were indicted for criminal conspiracy. C. elected to be tried separately and was convicted. He carried his appeal—*Crumph vs. Commonwealth*—to the Court of Appeals of Virginia, where the conviction was affirmed. Judge Fauntleroy, in the opinion, said: "The essential idea of 'boycotting,' in Ireland or the United States, is a confederation, generally secret, of many persons, whose intent is to injure another by preventing any and all persons from doing business with them, through fear of incurring the displeasure, persecution and vengeance of the conspirators. A wanton, unprovoked interference by a combination of many with the business of another for the purpose of constraining that other to discharge faithful and long-trained servants, or to employ whom he does not wish to or will employ—an interference intended to produce, and likely to produce, annoyance and loss, to that business—will be restrained and punished by the criminal law, as oppressive to the individual, injurious to the property of the community, and subversion of the peace and good order of society. The defendant lays great stress upon the Massachusetts case of *Commonwealth vs. Hunt*, 4 Metcalf's Reports, p. 111, as authority to sustain the legality of boycotting, but there is an obvious distinction between that case and this. That case arose out of the action of a club or combination of journeymen bootmakers, which had been formed simply to better their own condition, and it had no aim or means of aggression upon the business or rights of others. They simply had regulations for themselves; they did not combine or operate to oppress others. But, even in that case, the court, after supposing the case of a combination for the ultimate and laudable object of reducing by mere competition the price of bread to themselves and their neighbors, said: 'The legality of such an association will therefore depend upon the means to be used for its accomplishment. If it is to be carried into effect by fair and honorable means, it is, to say the least, innocent; if by falsehood, or force, it may be stamped with the character of conspiracy.' 'Force may be operated either physically or mechanically; or it may be coercion by fear, threat, or intimidation of loss, injury, obloquy, or suffering.' The acts of the defendant and his associates here are unlawful and incompatible with the prosperity, peace and civilization of the country; and if they can be perpetrated with impunity by combinations of irresponsible cabals or cliques, there will be an end of government and of society itself. The motto of the law is this: 'So use your own rights that you shall not injure others' rights.'"

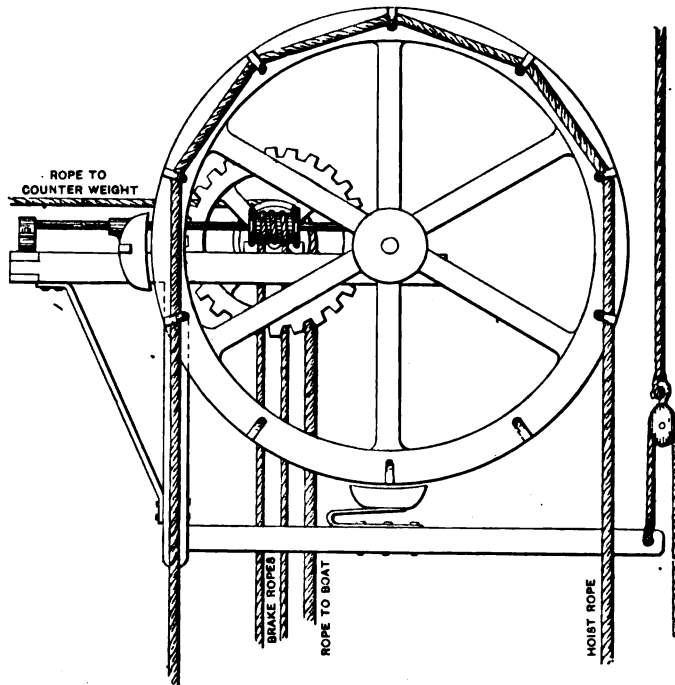


Fig. 283.—Side View of Hoisting Apparatus.

are 7 feet long, and the bottom or platform $3\frac{1}{2} \times 4\frac{1}{2}$ feet. The cross-bar where the rope attaches to the bottom has two arms on it to catch and take up the hatchway cover of the floor above, Fig. 284. The lifting rope goes through the center of this hatchway cover, which is kept in place by guides, the same as the boat. Hence when the elevator is down the door or hole is always closed, and no one can step through.

To the main drum that winds up the boat there is a rope attached which runs

weight is a box 1 foot square on the bottom, 2 feet long, filled with fine scrap iron. It has guides on two sides and runs up and down like the boat, always there. The actual cost was considerably less than \$40, counting in my expenses. It now carries five kegs of Nails easily, and I can change the drum so as to make it handle ten, but, of course, what is gained in power is lost in time; 500 pounds is all I ever want to handle, and if I had 700 pounds on and did not care to pull much I would call for another hand to help work the rope. I would not be without it now if it were to cost me \$200 or more. If any of your readers would like further details in regard to this matter I should be pleased to send them.

"Boycotting"—Criminal Conspiracy.

B. Brothers were stationers and printers in Richmond, Va., and they refused, on the application of the Richmond Typographical Union, No. 90, to make their printing office a "union office"; whereupon these printers and a trades union association known as "Knights of Labor," the former numbering 100 members and the latter several thousand men, declaring that they would destroy the business of B. Brothers by "boycotting" them, threatened a number of the business men and others in Richmond with the loss of their business if they dealt in any way with B. Brothers, and that their names would be published in a "black list" in the *Labor Herald*. In this same *Labor Herald* the employees of B. Brothers were denounced so that public feeling should be directed against them, even to preventing

The exportation of silk from Japan during the year 1887-88 was estimated at 38,958 bales, against 26,370 bales in 1886-87. The United States are at present the largest consumers of Japanese silk and figure in the last report for nearly 21,000 bales, while only 1735 bales were exported to Great Britain. The crop of 1888, estimated, is roughly at about 6,500,000 pounds, of which about 40 per cent. will be consumed in the country.

The London *Engineer* says: Now that the question of Ramsbottom's trough is under discussion in connection with the "race to Edinburgh," it may be worth pointing out that the late Mr. Ramsbottom was not the first and true inventor of the contrivance. It was patented in America in November, 1854, by McDonald. Mr. Ramsbottom's English patent was taken out in 1860, and is numbered 1527.

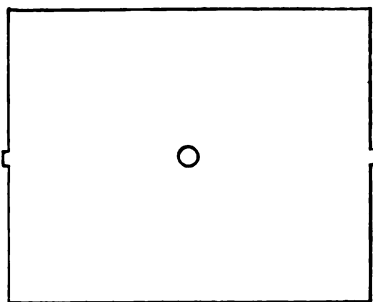


Fig. 284.—Hatchway Covering.

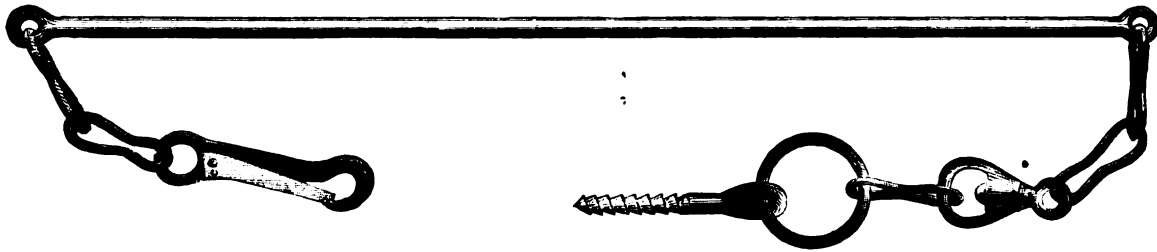
to the back end of the shop, and there a counterweight is attached weighing about 280 pounds. Thus weighted the boat will go up at a good motion alone, and stop when at the right point. This weight is of great importance. The boat never falls or jerks around and it holds back when going down loaded as much as it helps going up. When going down loaded I soon found that my screw brake was not

Horse Hitchings.

Oliver Bros. & Phillips, Pittsburgh, Pa., for whom the H. B. Newhall Company, 107 Chambers street, New York, are agents, are manufacturing a line of Stiff Horse Hitchings, which are represented in the illustration given herewith, which ex-

ing in one of the flanges for holding the wheel in place, so that it has water both on its inside and outside. When operating the machine the water in the center of the wheel is described as being driven through the pores of the wheel, wetting every particle thoroughly. This is referred to as preventing the tool while be-

water. For grinding scissors the guide A attached by the screw C is removed. The facility with which carving or table knives can be ground on this machine is alluded to, and it is claimed that any person, however inexperienced, can do this perfectly. The weight of the machine is 5 pounds. Fig. 3 represents the Clipper Grinder



Horse Hitchings.

plains the article so fully that no detailed description is necessary. The special advantage alluded to in the use of this article is that it will prevent cribbing. It is made of iron, and is furnished both self-colored and galvanized.

Clipper Tool, Knife and Scissors Grinders.

The Higganum Mfg. Corporation, 189 and 191 Water street, New York, are putting on the market an interesting line of grinders, invented and patented by Mr. R. Dutton, some of which are illustrated in the cuts herewith given. Fig. 1 represents their No. 4 Clipper, which is run, it will be observed, by means of a belt, and is designed for grinding plane irons, chisels, gouges, &c. It has four wheels, numbered 1, 2, 3 and 4 in the cut. There are also, it will be seen, clamps E and F, which are used for holding the tools to be ground. The wheels 1, 2 and 3 are used for grinding gouges, and are respectively $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ inch in thickness, the rims being rounded. Small gouges less than $\frac{1}{4}$ inch in diameter will be ground upon wheels Nos. 2 and 3 while held and guided with the hands, but for larger gouges the swivel and gauge clamps, F and H, are used, the cut representing this attachment as down in the position in which it naturally remains when not in use. In using this clamp the gouge to be ground is

ing ground from heating or having its temper drawn, and also preventing the wheel from becoming glazed by use. The tool while being ground is held firmly in the clamp E, which is directly in front of the operator and controlled by his left hand by means of the handle D. By

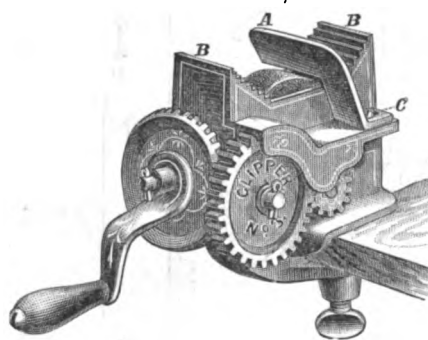


Fig. 2.—No. 3 Clipper Grinder, with Attachment for Grinding Scissors.

this means plane irons, chisels, &c., may be quickly ground to the bevel desired, and the manufacturers allude to the accuracy and perfection with which this is done. It is claimed that with this machine a gouge can be as quickly and easily ground as an ordinary plane iron or chisel.

No. 1, which has, it will be observed, some of the features of the machine shown in Fig. 1, the corundum wheel being 5 inches in diameter, $1\frac{1}{4}$ -inch face, with a hole in the center 3 inches in diameter by which the water in the trough is given access to it. By one turn of the crank the wheel is revolved nine times, so that grinding will be done more rapidly than upon a large wheel when not geared. The same machine is made without a stand and provided with thumb screw to clamp it on the bench. It is pointed out that

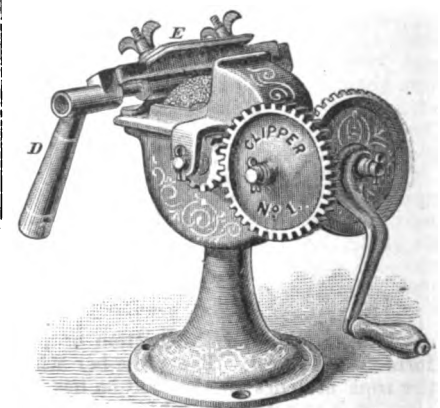


Fig. 3.—No. 1 Clipper Grinder.

with this machine plane irons, chisels, &c., may be ground to any bevel desired. The company also make another machine, Fig. 4, which they designate as No. 5, which is intended for the same purpose as their No. 1, shown in Fig. 3, but it has a pulley and belt in place of a crank and gear to run it by. The speed of this machine

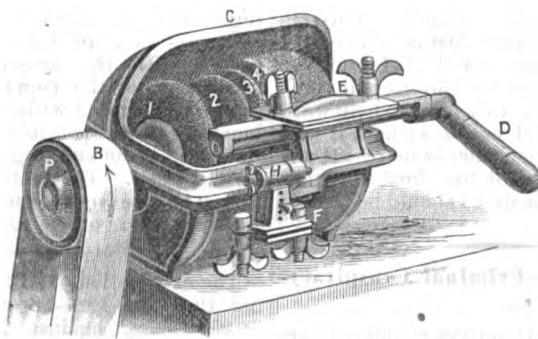


Fig. 1.—No. 4 Clipper Grinder, with Attachment for Grinding Gouges.

securely fastened in it at F, the hinge at H permitting the requisite pressure on the wheel, while the rocking motion permitted by the swivel allows the grinding of the entire edge of the gouge, an operation which is, it is claimed, accomplished with great ease and success. Wheel No. 4 is flat-faced, $1\frac{1}{4}$ inches thick, 5 inches in diameter, and has a hollow in the center 3 inches in diameter. The corundum grinding-wheel used in this machine is referred to as superior to the emery-wheel. Water when placed in the trough is admitted to the inside of the wheel through a small open-

This grinder is intended to be run from 700 to 800 turns per minute, the arrow showing the direction. Its weight is $17\frac{1}{4}$ pounds.

Fig. 2 represents the No. 3 machine, a tool designed for family use, for sharpening knives, scissors, &c. The machine is represented in the illustration as clamped to the corner of a table. The wheel, like that described above, is a corundum wheel 4 inches in diameter, with 1-inch face, geared to revolve six times to one turn of the crank, grinding as fast as a wheel 24 inches in diameter not geared. The wheel runs, it will be observed, in a trough of

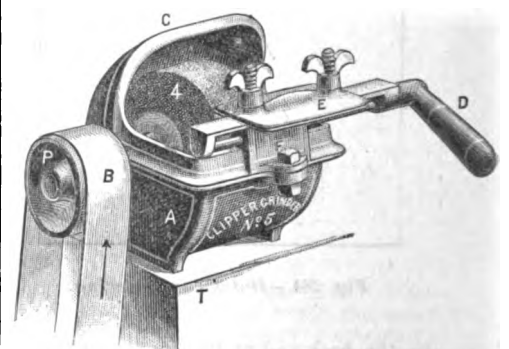


Fig. 4.—No. 5 Clipper Grinder.

should be from 700 to 800 revolutions per minute. They also make a No. 2 Grinder in which a free grit stone is used. It is a small and compact machine for sharpening tools, knives, &c.

The American Frame Pulley.

We illustrate herewith the American Frame Pulley, a new form now being put on the market by Palmer Hardware Mfg. Company, Troy, N. Y. Like their other

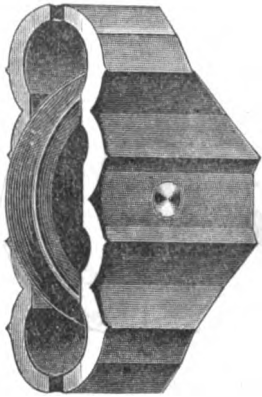


Fig. 1.—The American Frame Pulley.

styles of pulleys, it has its face edges curved to adapt it to fit a mortise made of a series of connected auger holes, and has markers on its edges with which to indent in the wood the exact centers on which to

L. & I. J. White.

The following article from the Buffalo Express, giving as it does a history of this long-established and well-known house, will be read with interest:

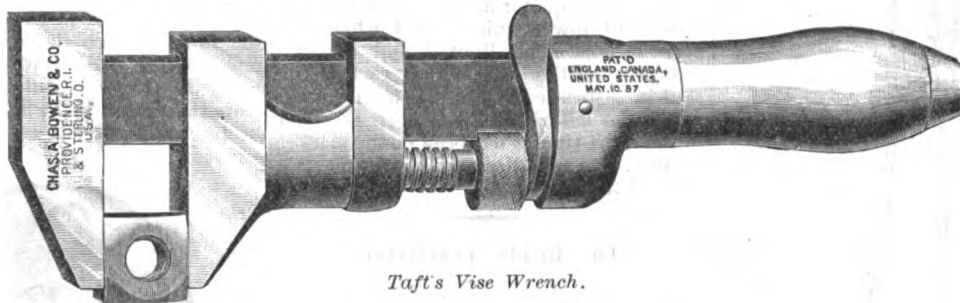
Buffalo possesses numerous points of advantage for the manufacture of specialties, and among the local industrial establishments are many whose field of operations covers the whole nation. One of the firms who e mail bears the postmarks of almost every town in the United States, as well as the strange stamps of foreign countries, is the long-established edge-tool works of L. & I. J. White, at Nos. 310, 312 and 314 Exchange street. Mr. Leonard White, the surviving partner of this widely known firm, is the oldest practical edge-tool man in America. He was born in Tolland, Conn., November 16, 1810. His family migrated to this State in 1819, settling in the town of Elba, Orleans County. When Mr. White was 16 years of age he went to Rochester to learn the trade of an edge-tool maker. For 10 years he remained in the employ of D. R. Barton, at that time the only prominent edge-tool manufacturer in this country, and during a decade of hard work he mastered the business in all its details.

In 1836 Mr. Leonard White, in company with his brother, Mr. I. J. White, established an edge-tool factory at Monroe, Mich., where for some years they carried on a flourishing business. Becoming impressed, however, with the idea that Buffalo was a more advantageous point of distribution than the Michigan town, they decided finally to change their base of operations. Accordingly, in 1844, Mr. I. J. White came here and established a new plant, on the corner of Ohio and Indiana streets.

In 1879 Mr. I. J. White died, but the well-known firm name is still retained by his brother.

Taft's Vise Wrench.

This article is manufactured by Chas. A. Bowen & Co., Sterling Ohio, and is illustrated herewith. The special feature of the wrench is the tightening device, the arrangement of which is shown in the cut. From this it will be seen that the wrench is provided with a lever, which serves as a tightening device. This lever works on a screw in the ferrule. In use the wrench is screwed on to the work in the ordinary manner, the lever being raised in a perpendicular position, when, by pressing the lever down to the position shown in the cut, the wrench is given a vise-like grip so that it cannot slip from the work. The wrench itself is described as made of the best material, care being taken to make it a first quality article, and the manufacturers allude to the advantages it possesses in view of its tightening device, mentioning among other points that it never slips; that it is a combination of wrench, hand-vise and clamp in a single tool; that with it nuts can be taken off the corners of which have been grooved or rounded; that with it hot nuts may be removed without handling them, while they also indicate several other purposes for which it can advance-



Taft's Vise Wrench.

start the bit. The case is made up of a series of angular swellings, the apexes of which extend slightly beyond the curved lines of the face edges—the rear edge of the case being a hollow chisel. The manufacturers claim for this construction entire avoidance of the danger of splitting the jambs, as is likely to occur with those made to fill at all points a like mortise, on account of variation in position or inclination of the holes, which is unavoidable in those bored by hand. This improved form, it is claimed, will, by means of the

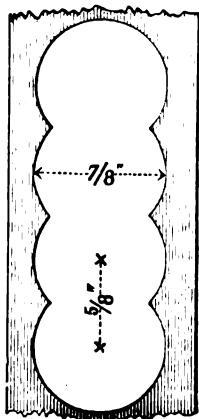


Fig. 2.—Mortise for American Frame Pulley.

rear chisel edges, cut away all obstructions caused by imperfect boring, and the apexes of the angles will hold it firmly in place. Its finish is referred to as being of the best. Only one size, 2 inches, is made. The pulleys have steel axles, and a 7/8-inch bit is used for mortising.

Two years later he was rejoined by his brother, who had remained in Michigan to close up the business.

About 20 years ago the works of the firm were destroyed by fire, and being desirous of rebuilding on a larger scale, the Exchange street property was secured and the present extensive works were erected. The main building, a three-story brick, is 60 x 104 feet, with an addition, 55 x 104, extending through to Carroll street. The large structure contains on the first floor the office and the grinding and polishing departments, where the duly shaped and tempered tools receive their polish and cutting edges. On the second floor is the storeroom, where the finished tools lie in drawers and cases, all classified and ready to start on their journey to Nova Scotia or San Francisco, at an hour's notice. Here too are the machine shop, pattern shop and handling department. The third floor is used as a storeroom for handle stock, packing boxes, &c.

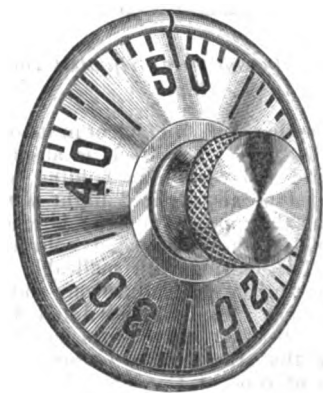
The entire extension is used as a forgeshop, and here, by means of Trip Hammers, Drop Hammers, and powerful rolls, driven by a 120 horse-power engine, the metal red from the furnace fires is welded, hammered, and rolled into the shapes which give the first hint of the finished tool. Practical edge-tool men declare this to be the best-equipped tool-forge shop in this country.

The implements made by L. & I. J. White may be divided into four general classes. First and most important among these is their line of Cooper's Tools, of which, with perhaps a single exception, they are the most extensive makers in America. These include every imaginable implement pertaining to the cooper's trade. The firm likewise turn out a great many carpenters' tools, particularly Chisels, Draw-Shaves, Plane Irons and Ship-Carpenters' Tools. A third specialty of the house is a complete assortment of Butchers' Tools, embracing all the implements used in packing houses and meat markets. And last, but not least at the present time, the vast increase in the number of planing mills and kindred industries requiring Knives, the same including Stave, Hoop and Veneer Knives, Paper-Cutting and Leather Splitting, &c., has enlarged the demand to such proportions that the Machine Knife department is now one of the most important of the business.

tageously be used. Its utility in the machine shop and for general use is also referred to.

Improved Dial.

Miller Lock Company, Philadelphia, Pa., have made some recent improvements in their Champion Keyless Locks, one of



Dial (New) for No. 302, Full Size.

which relates to the combinations being made more simple without any sacrifice of security, so as to obviate the difficulty of understanding and fitting these locks in place correctly. Another improvement is in the enlargement of the dial, which is made as legible as possible, as shown in the accompanying illustration. This change is made to overcome as far as possible the difficulties in using keyless locks where there is an imperfect light, and is regarded as a decided improvement. As

some, however, may prefer the former style of dial the company are making both the old and the new. The demand for these locks for private use and for clubs, gymnasiums, associations, &c., is referred to as being such as to require an increase in the manufacturing facilities.

Sure-Grip Steel Tackle Block.

The Fulton Iron and Engine Works, Detroit, Mich., are putting on the market the Detroit Patent Sure-Grip Steel Tackle Block, which has been invented by Alexander M. Kerr, the superintendent, and patented September 4, 1888. The special feature of its construction is the brake, which, it will be observed, is exceedingly simple, consisting only of a wedge, which is

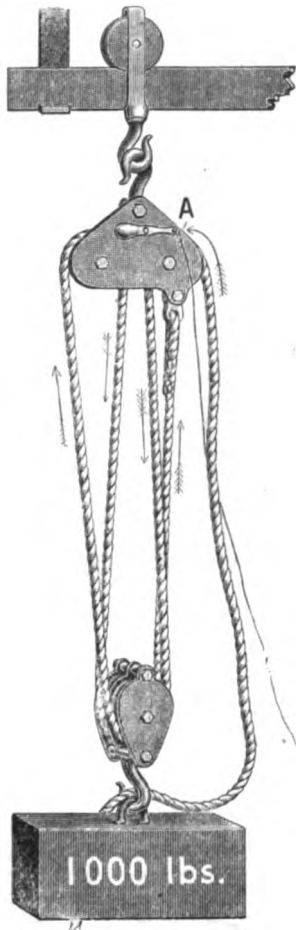


Fig. 1.—Detroit Sure-Grip Steel Tackle Block.

double acting, and so efficient in its operation, that it is described as absolutely automatic and certain in holding a load suspended at any desired height without fastening the rope. The body is made of steel plates, the pins being cold rolled steel. The castings are malleable iron, thus making an especially strong and safe construction. The brake is a fluted wedge, dropped between two ropes in such a manner that the load is brought on all strands of rope at the same time. It is also pointed out that the heavier the load the more efficient the brake, owing to the fact that the fluted wedge is drawn down and points between the sheaves in proportion to the weight of load. It is also pointed out that the construction is such that the brake does not flatten the rope, wear on it being thus reduced to a minimum, and it is claimed that a partially worn rope can be used in this machine to as good advantage as a new one. The economy of labor connected with its use is also alluded to, as by its use one man can take the place of two as the brake holds the load at the end of each effort made by the operator,

thus enabling him to secure a fresh grip on the load with both hands, or the load can be left hanging at any point without further attention. This block is intended for use by bridge and ship builders, contractors, hardware and other merchants, truckmen, machine shops, &c., and in

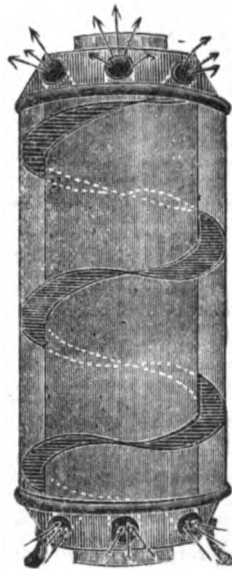


Fig. 2.—Showing Arrangement of Brake.

stringing heavy electric wires, handling barrels, baled hay, &c. The invention is the result of a necessity long felt in the company's shops for a block which would raise and lower quickly and where the height of hoist is not limited, and with no possibility of the brake slipping when the load is suspended. The satisfaction with which the contrivance has been received in the short time it has been on the market is alluded to as indicating that it meets a want of the trade.

The Reddy Ventilator.

James M. Reddy, 317 South State street, Chicago, has designed an apparatus for securing increased efficiency from stoves, which he designates the Reddy Venti-



The Reddy Ventilator.—Fig. 1.—Sectional Elevation.

lator and Coal and Wood Economizer. It is illustrated in the accompanying cut, and consists of a sheet-iron cylinder with heads of cast iron. It is fitted with pipe collars at the top and bottom and can be used in various ways. It can be placed on top of an ordinary cylinder stove, with the smoke-pipe attached to the top and passing thence to the chimney; or it can take the place of a section of pipe on a base-burner; or it can be used as a drum

in an upper room, having a connection through the floor with a range, cooking stove or heating stove in the room below. Its construction is simple. There are two sheet-iron drums, having a spiral division running up between them, with openings at the top and bottom. Air from the room passes into the center drum, and the smoke and heat from the stove circulate around the spiral passage between the

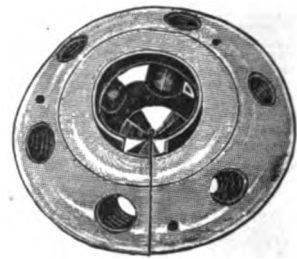


Fig. 2.—Looking Down on Top of the Head of Ventilator, Showing Damper.

two drums, heating the air, which is discharged into the room again from the upper openings, while the smoke is conveyed through the regular stove-pipe up the chimney. Two cuts herewith given show the construction of the head of the heater. This has a ventilating damper, which is left open for ten minutes or so at frequent intervals to take the foul air from the room up the chimney. When this ventilator is open no heat is thrown out into the room from the heater, but when it is closed the heater again discharges hot air into the



Fig. 3.—View Looking Inside the Head of the Heater, Showing its Construction.

room. It can be readily perceived that this device forms quite a reinforcement to the power of a stove of ordinary construction and thus secures additional heat from the fuel burned, making it possible to secure much more heat from the same fuel than when the stove alone is used. The size of the heater is 33 inches high and 12½ inches in diameter. It is mounted with either Wood's Russia planished iron or smooth sheet iron.

The Car Spring Association.—The directors of the Railway Car Spring Association held a meeting at the Hotel Anderson, Pittsburgh, on Saturday, the 18th inst. A. French, chairman of the A. French Spring Company, Limited, of that city, presided. The meeting was preliminary to the general meeting to be held on Wednesday of the present week. Only two firms in the United States are not in the association, one being the Atkinson Car Spring Company, of Chicago. This firm have brought suit against the organization and also against Park, Brother & Co., Limited, of Pittsburgh, who refused to sell them steel except at an advance of \$10 per ton over what members of the association paid. The directors talked over the disposition of these two suits, and, it is reported, will contest them to the end.

OCTOBER 17, 1888.

Amunition.

Apple Parers.	
Advance.....	7 doz. \$4.75
Antrim Combination.....	7 drs. 5.50
Baldwin.....	7 doz. 5.25
Champion.....	7 doz. 5.25
Eureka, 1888.....	each 17.00
Family Bay State.....	7 doz. 12.00
Gem.....	7 doz. 5.25
Gold Medal.....	7 doz. 4.00
Hudson's New '88.....	7 doz. 3.75
Ideal.....	7 doz. 4.75
Improved Bay State.....	7 doz. 36.00
Little Star.....	7 doz. 6.00
Monarch.....	7 doz. 13.50
New Lightning.....	7 doz. 5.50
Oriole.....	7 doz. 4.00
Penn.....	7 doz. 4.00
Perfection.....	7 doz. 4.00
Perron.....	7 doz. 4.00
Rocking Table.....	7 doz. 6.00
Turntable.....	7 doz. 4.50
Victor.....	7 doz. 13.50
Waverly.....	7 doz. 4.50
White Mountain.....	7 doz. 4.50
72.....	7 doz. 4.25
73.....	7 doz. 4.75
78.....	7 doz. 9.50

Blind Adjusters.
 Domestic..... \$ per doz \$3.00—dis 33 1/2 %
 Resistor..... \$ doz \$10.00—dis 50 & 10 & 3 %
 Washburn's Self-Locking..... dis 20 @ 20 & 10 %

Loose Joint, Japanned.....
Loose Joint, J.p. with Acorns.....
Parliament Butts.....
Mayer's Hinges.....
Loose Pin, Acorns.....
Loose Pin, Acorns, Japanned.....
Loose Pin, Acorns, Jan. Pin, Pins.....

.....ds 70&10

Wrought Steels—	
Fast Joint, Narrow	dis 70&10
Fast Joint, Lt. Narrow	dis 70&10
Fast Joint, Broad	dis 70&10
Loose Joint, Broad	dis 70&10
Table Butts, Back Flange, &c.	dis 70&10
Inside Blind, Regular	dis 70&10
Inside Blind, Light	dis 70&10
Loose Pin	dis 70&10
Bronzed Wrought Butts	dis 40&10 40&10&5

Calipers.—See Compasses.

Calks, Toe	
Gautier	dis 54&60
Dewicks	dis 54&60
Can Openers.	
Messenger's Comet	dis 33.00, dis 36
American	dis 33.00, dis 36
Duplex	dis 36, dis 15 30
Lyman's	dis 36, dis 15 30
No. 4, French	dis 36, dis 55 60
No. 5, Iron handle	dis 36, dis 55 60
Eureka	dis 36, dis 55 60
Sardine Sissors	dis 36, dis 55 60
Star	dis 36, dis 55 60
Sprague, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 36, dis 55 60
World's Best, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 36, dis 55 60
Universal	dis 36, dis 55 60
Domestic	dis 36, dis 55 60
Champion	dis 36, dis 55 60

Cards	
Knife and Curry	dis 10&10 10&10&10
Otton	dis 10&10 10&10&10
Wool	dis 10&10 10&10&10

Carpet Stretchers.	
Cast Steel, Polished	dis 12.25
Cast Iron, Steel Points	dis 12.25
Socket	dis 12.25
Ball's	dis 12.25

Carpet Sweepers.	
Bissell No. 5	dis 17.00
Bissell No. 7 New Drop Pan	dis 19.00
Bissell Grand	dis 19.00
Grand Rapids	dis 19.00
Crown Jewel	dis 19.00
Magic	dis 19.00
Improved Parlor Queen, Nickle Trimmed	dis 19.00

Improved Parlor Queen, Japanned Trimmed	
Excelsior	dis 19.00
Garland	dis 19.00
Parlor Queen	dis 19.00
Housewife's Delight	dis 19.00
Queen	dis 19.00
Queen, with band	dis 19.00
King	dis 19.00
Wood Improved	dis 19.00
Hub	dis 19.00
Cog Wheel	dis 19.00

Cartridges.—See Ammunition.	
Casters.	

Bed.	
Plate	dis 55 55&5
Shallow Socket	dis 55 55&5
Deep Socket	dis 55 55&5
Yale Casters, list May, 1888	dis 55 55&5
Yale, Gem	dis 55 55&5
Martha's Patent (Phoenix)	dis 55 55&5
Payson's Anti-Friction	dis 55 55&5
"Giant" Truck Casters	dis 55 55&5
Stationary Truck Casters	dis 55 55&5

Castle Leaders	
Hamson, Beckley & Co.	dis 55 55&5
Sargent's	dis 55 55&5
Stockings	dis 55 55&5
Peck Stow & W. Co.	dis 55 55&5

Chain.	
Trace, 6-10-12, exact sizes, 3 pair, 1.11	dis 55 55&5
Trace, 6-10-12, exact sizes, 3 pair, 1.11	dis 55 55&5
Trace, 6-10-12, exact sizes, 3 pair, 1.11	dis 55 55&5

Shallow Socket.....	Others...dis 60 @ 60&5
Deep Socket.....	40&10
Yale Casters, list May, 1884.....	dis 30&10@40

Door Por. Por. Nickel \$3.00 @ 2.35
Door Por. Plated, Nickel..... \$3.00 @ 2.35
Drawer, Porcelain dis 55¢10¢10¢10¢10¢10¢10¢
Hemlock Door Knobs, new list..... dis 40¢10¢10¢
Horn, Towne Wood Knob, list Dec., 1888..... dis 40¢
Furniture Plain..... 75¢ gross incl. dis 10¢
Furniture, Wood Screws..... dis 25¢10¢
Base, Rubber Tip..... dis 70¢10¢10¢
Picture, Judd's..... dis 60¢10¢10¢10¢ @ 70¢
Picture, Sarjen's..... dis 70¢10¢
Picture, Hemlockite..... dis 35¢25¢
Picture, Porcelain..... dis 65¢10¢
Carriage Japanese..... 7 gross 50¢, dis 60¢10¢
Ladies.
Melting, Sargent's..... dis 55¢10¢
Melting, Reading..... dis 35¢10¢
Melting, Monroe's Patens..... 7¢ dos. \$4.00, dis 40¢
Melting, P. & W..... dis 55¢10¢ @ 40¢
Melting, Warner's..... dis 30¢
Lawn Mowers.
Standard List..... dis 50¢10¢
Enterprise..... dis 60¢10¢
Refrigerators.
Tubular, Plain, with Guards..... 7¢ dos \$4.00 @ \$4.50
Tubular, Lift Wire, with Guards..... 7¢ dos \$4.50 @ \$4.75
Tubular, Square Plain, with Guards..... 7¢ dos \$4.00 @ \$4.50
Tubular, Sq Lift Wire, with Guards..... 7¢ dos \$4.25 @ \$4.50
Without Guards, 25¢ 7 dozen less.
Police, small, 90¢; Med. 97.50; Large, 90.75. dis 30¢25¢
Combs Sewers.
Wooden Lined, No. 1..... 7¢ dos. \$6.00, dis 32¢20¢
No. 2..... 7¢ dos. \$3.00, dis 35¢
No. 3..... 7¢ dos. \$1.70 @ 1.75
Dunlap's Improved..... 7¢ dos. \$3.75, dis 35¢10¢
Jammis'..... No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 6

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Syracuse Screw-Drivers Bits.....dis 30 & 30 1/2
Screw Driver Bits.....dis 50 & 75
Screw Driver Hitz, Parr's.....dis 25
Wray's Hol. Hdie. Sets, No. 8, 11 1/2.....dis 35 & 10
P. D. & Co.'s, all Steel.....dis 50
Screws
Wood Screws-List, Brass, Jan. 27; Iron, July 1, 1887
Flat Head Iron.....dis 70
Round Head Iron.....dis 65 Ex. 10% often
Flat Head Brass.....dis 65 given by
Round Head Brass.....dis 60 jobbers.
Flat Head Bronze.....dis 65
Round Head Bronze.....dis 60
Machines
Flat Head, Iron.....dis 85
Round Head, Iron.....dis 80
Bench, Iron
Bench, Iron.....dis 55 & 10 @ 55 & 10 1/2
Bench, Wood, Beech.....dis 25
Bench, Wood, Hickory.....dis 20 & 10
Hand, Wood.....dis 25 & 10 @ 25 & 10 1/2
Lag, Blunt Point.....dis 75
Cocon and Lag, Gimlet Point.....dis 75
Belt, Rail, Sargent.....dis 65
Hand Rail, Humason, Beckley & Co.'s.....dis 70 & 10 @ 70 & 10 1/2
Hand Rail, Am. Screw Co.....dis 75
Jack Screws, Millers Falls List.....dis 50 @ 50 & 5
Jack Screws, P. S. & W.....dis 35
Jack Screws, Sargent.....dis 60 & 10 @ 60 & 10 1/2
Jack Screws, Stevens.....dis 40 @ 40 & 10
Roosters, complete, \$10.00.....dis 25
Roosters, complete, \$4.00.....dis 25
Barnes' Builders' and Cabinet Makers', \$15.....dis 25
Seythe Shears.....dis 60 & 2
Shears
American (Cast) Iron.....dis 75 & 10 @ 75 & 10 1/2
See Pruning Hooks and Shears
Bernard's Lamp Trimmers.....dis 20 & 25
Timmer's.....dis 20 & 25
Seymour's List, Dec. 1881 dis 60 & 10 @ 60 & 10 1/2
Heinrich's List, Dec. 1881 dis 60 & 10 @ 60 & 10 1/2
Heinrich's Tailor's Shears.....dis 84 & 4
First quality C. S. Trimmers.....dis 80 & 10 @ 80 & 10 1/2
Second quality C. S. Trimmers.....dis 80 & 10 @ 80 & 10 1/2
Cast Shears.....dis 10 & 10
Diamond Cast Shears.....dis 10
Chipper.....dis 10 & 10
Victor Cast Shears.....dis 75 & 10 @ 75 & 10 1/2
Howe Bros. & Hubert, Solid Forged Steel.....dis 40
Cleveland Machine Co., Solid Steel Forged.....dis 70
Clausen & Co., Japan.....dis 60
Cast Shears Co., Nipkeled, same list.....dis 60
Shovels
Shining Door
M. W. & Co., list July, 1888.....dis 50 & 10 @ 50 & 5
R. & E. list Dec. 18, 1886.....dis 55 & 2
Corbin's list.....dis 60 & 10 & 2
Patent Roller.....dis 60 & 10
H. H. Hamel.....dis 75
Russell's Anti-Friction, list Dec. 18, 1885.....dis 60 & 2
Moore's Anti-Friction.....dis 60
Shining Sauter
R. & E. list Dec. 18, 1885.....dis 60 & 10 & 2
Sargent's list.....dis 60 & 10
Reading list.....dis 60 & 10 & 10
Ships
J. J. White.....dis 30 & 5
Albertson Mfg. Co.....dis 35
Sheets, Merce, Mfile, &c.
Horse
Burden's, Perkins', Phoenix, at factory.....\$4.00
Wale-Add \$1 & 1/2 kg to above prices.
On Weight
100 tons.....dis 9
500 & 1000.....dis 9 1/2
1000 & 1000.....dis 10
Shet.....(Eastern prices, 25 off. each, 5 days.)
Drop, 1 bag, 25 lb.....\$1.50
Drop, 1 bag, 25 lb......88
Sack and Chilled, 1/2 25-lb bag.....\$1.75
Sack, 1/2 25-lb bag......80
Shave and Spades.....dis 40
Ame's Shovels, Spades, &c., list Nov. 1, 1888.....dis 30
Note-Jobbers frequently give 5 @ 7 1/2 % extra on above.
Griffith's Cast Iron.....dis 50 & 10
Griffith's C. S.....dis 60 @ 60 & 10
Griffith's W. Steel list Nov. 1, 1887.....dis 20
Co. Colony (Sanford Fork & Tool Co.).....dis 20
Lafayette Shovel Co.....dis 20 @ 20 & 7 1/2
Hussey, Binas & Co.....dis 15 @ 15 & 5
Hubbard & Co.....dis 20 @ 20 & 7 1/2
Lehigh Mfg. Co.....dis 60 & 10
Payne Petebone & Son, list January, 1886.....dis 30
Bemington's, Bowman's Patent.....dis 30 & 10 @ 40
Bowling's Steel Iron.....dis 60 & 10
Bowling's Steel.....dis 60 & 5
Shevele and Tenge.....dis 60 & 10 @ 60 & 10 & 5
Iron Head.....dis 60 & 10 @ 60 & 10 & 5
Brass Head.....dis 60 & 10 & 10
Skeins, Thimble
Western list.....dis 75 & 5 @ 75 & 10
Fitch's (British).....dis 20
Coldbrookdale Iron Co.....dis 50 & 10
Utica P. S. T. Skeins.....dis 60
Utica Turned and Fitted.....dis 35
Sieves
Buffalo Metallic, S. S. & Co., new list.....dis 50 & 25 & 10
Earier Flour Sifters.....dis 20
Smith's Wire Sieves.....dis 20
Smith's Adjustable Milk Strainer.....dis 25
Smith's Adjustable F. & C. Strainer.....dis 17 & 5
Stages, Wooden Rim.....Iron. Plated.
Mesh 18, Nested, 1/2 doz.....70 90
Mesh 20, Nested, 1/2 doz.....80 1.00
Mesh 24, Nested, 1/2 doz.....1.00 1.10
Slates-School, by case.....dis 50 & 10
Snaps, Harness, &c.
Anchor & S. Mfg. Co.....dis 65
Fitch's (British).....dis 60 & 10
Hotchkiss.....dis 10
Andrews.....dis 60
Sargent's Patent Guarded.....dis 70 & 10 @ 10
German, new list.....dis 10 & 10
Covert.....dis 50 & 2
Covert, New Patent.....dis 50 & 2
Covert, W. R. E.....dis 60 & 2
Covert Spring.....dis 60 & 10 & 10
Soldering Irons
Covert's Adjustable, list Jan. 1, 1886.....dis 35 & 2
Speke Shaves-Iron.....dis 45
Wood.....dis 80
Balle's (Stanley R. & L. Co.).....dis 40 & 10
Stearns'.....dis 30 & 10 @ 30
Bonny's, Trimmers
Bonny's.....dis 10.00, 10.50
Stearns'.....dis 20 & 10
Ives'.....dis 11.00, 12.00, 13.00, 14.00, 15.00, 16.00, 17.00, 18.00, 19.00, 20.00, 21.00, 22.00, 23.00, 24.00, 25.00, 26.00, 27.00, 28.00, 29.00, 30.00, 31.00, 32.00, 33.00, 34.00, 35.00, 36.00, 37.00, 38.00, 39.00, 40.00, 41.00, 42.00, 43.00, 44.00, 45.00, 46.00, 47.00, 48.00, 49.00, 50.00, 51.00, 52.00, 53.00, 54.00, 55.00, 56.00, 57.00, 58.00, 59.00, 60.00, 61.00, 62.00, 63.00, 64.00, 65.00, 66.00, 67.00, 68.00, 69.00, 70.00, 71.00, 72.00, 73.00, 74.00, 75.00, 76.00, 77.00, 78.00, 79.00, 80.00, 81.00, 82.00, 83.00, 84.00, 85.00, 86.00, 87.00, 88.00, 89.00, 90.00, 91.00, 92.00, 93.00, 94.00, 95.00, 96.00, 97.00, 98.00, 99.00, 100.00
Douglass.....dis 20
Spears and Ferks
Ironed Iron
Central Stamping Co.'s list.....dis 70 & 10
Solid Table and Tea, Central Stamping Company's
list.....dis 70 & 10
Buffalo, S. S. & Co.....dis 33 & 2
Wier-Plated-4 mos. or 5 % cash 31 days.
Meriden Brit. Co., Rogers.....dis 60
C. Rogers & Bros.....dis 60
Reed & Barton.....dis 50
Wm. Rogers Mfg. Co.....dis 50 & 10 @ 50 & 10 & 5
Simpson, Hall, Miller & Co.....dis 50 & 10

Ralmer & Edwards Silver Co., dis 50¢10 @ 50¢10&15
H. E. & S. Silver Co., Durham Silver dis 50¢15
H. E. & S. Silver Co., Durham Silver dis 50¢15
German Silver, Hall & Elton dis 50¢15
Nickel Silver dis 50¢15 @ 50¢10&15, cash
Britannia..... dis #0
Boardman's Flat Ware dis 50¢10
Boardman's Nickel Silver dis 50
Boardman's Britannia Spoons, case lots..... dis 60 %
Springs.
Mill pte. Concord, Platform and Half Scroll..... dis 60 @ 60&15
Wing & Bolster Springs dis 25 %
Squares.
Steel and Iron dis 75 @ 80
Nickel Plate dis 60&10
Troy Square and T Bevels dis 40&10 @ 70 %
Dionston's Troy Square and T Bevels dis 40&10
Winterbottom's Try and Miter dis 80&10
Starrett's Micrometer Caliper Squares dis 25 %
Stamps.
Seize Staples, Galvanised } Same price as Barb Wire.
Fence Staps, Plain } See Trade Report
Steelwires dis 40&10 @ 50 %
Stocks and Dies.
Blacksmith's Waterford Goods dis 30&15 @ 30&10
Lightning Screw Plate dis 25 @ 30 %
Reece's New Screw Plates dis 33½ @ 33½&45
Stone.
Granite No. 1, 3& ; Axe, 5¼¢; Slips No. 1, 5¢. ¢ 2d
Sand Stone ¢ 15 @ 15&
Washta Stone, Extra ¢ 15 @ 15&
Washta Stone, No. 1 ¢ 15 @ 15&
Washta Stone, No. 2 ¢ 11 @ 12¢
Washta Slips, No. 1 Extra ¢ 40 @ 42¢
Washta Slips, No. 1 ¢ 30 @ 32¢
Washta Stone Small Whets ¢ 11, 5¢
Kansas Stone No. 1, 6 to 9 in. 4 to 5 in. ¢ 40¢
Turkery Oil Stone 4 to 5 in. ¢ 40¢
Lake Superior, Chase ¢ 1.00 @ \$1.50
Lake Superior Slips, Chase ¢ .81 @ .89
Seneca Stone, Red Paper Brand, ¢ 18 @ 20¢
Seneca Stone, High Round, ¢ 20 @ 25¢
Seneca Stone Small Whets, ¢ gro ¢ 32, 75
Steve Polish—Joseph Dixon's ¢ gro 3¢, dia 10 %
Gem ¢ gro \$2.50, dia 10 %
Gold Medal ¢ gro \$5.00, dia 35 %
Mirror ¢ gro \$5.00, dia — %
Lustro ¢ gro \$4.75 net
Ruby ¢ gro \$3.75 net
Diamonds ¢ gro \$5.50
Dixon's Plumbago ¢ gro \$5.00
Boynton's Noon Day, ¢ gro ¢ 50.00
Parlor Pride Stove Enamel ¢ gro, \$18
Yates' Liquid, 2 3 5 10 gal. cans
 ¢ gal.. \$0.90 .80 .70 .60
Yates Standard Paste Polish 10-lb cans, per lb., 15 ¢
Japanese ¢ gro \$5.50
Firestone ¢ gro \$2.50
Diamond O. K Enamel ¢ gro \$19.00
Bonnell's Liquid Stove Polish ¢ gro \$4.00
Bonnell's Paste Stove Polish ¢ gro \$4.00
Tacks, Brads, &c.
List Jan. 2, 1893.
Swedes Iron Carpet Tacks dis 73½ @ 10&2 %
Swedes Iron Carpet Tacks dis 73½ @ 10&2 %
Swedes Iron Carpet Tacks dis 73½ @ 10&2 %
Swedes Iron Out Tacks dis 70&10&2 %
Swedes Iron Upholsters' Tacks dis 67½ @ 10&2 %
Tinned Swedes Iron Tacks dis 67½ @ 10&2 %
Flat d'bw'd Swdes Iron Uphol's Tacks, dis 67½ @ 10&2 %
Lump Lead Tacks, List Price dis 67½ @ 10&2 %
Swedes Iron Gimps all Sizes dis 67½ @ 10&2 %
Swedes Iron Trimmers' Tacks dis 67½ @ 10&2 %
Swedes Iron Miners' Tacks dis 67½ @ 10&2 %
Swedes Iron Bill Posters' or Railroad Tacks dis 67½ @ 10&2 %
Swedes Steel Tacks, all kinds (Swedes iron price list), dis 73½ @ 10&2 %
Copper Finish Trunk and Clout Nails, dis 33½ @ 10&2 %
Copper Finishing Trunk and Clout Nails, dis 33½ @ 10&2 %
Finishing Nails dis 60&10&2 %
Trunk and Clout Nails dis 60&10&2 %
Tinned Trunk and Clout Nails dis 60&10&2 %
Basket Nails dis 60&10&2 %
Patent Patent Brads dis 60&10&2 %
Hungarian Nails dis 60&10&2 %
Chair Nails dis 60&10&2 %
Zinc Glaisers' Points dis 45&10&2 %
Cigar Box Nails dis 45&10&2 %
Picture-Frame Points dis 45&10&2 %
Looking-Glass Tacks dis 45&10&2 %
Weathered Carpet Tacks dis 45&10&2 %
Shoe Finders' List Jan. 2, 1893, dis 10 @ 10&2 %
Lining and Saddle Nails, List Jan. 1, 1893:
Silvered dis 30&10&10 %
Galvanized dis 20&10&10 %
Double-pointed Tacks 85 %
Wire Carpet Nails dis 50&10 %
Copper Nail and Nails See Trade Report
Steel Wire Brads, E. & W. Mfg. Co.'s, list dis 50&10
Tap Borers.—Common and Rare.
Javes' Tap Borers dis 33½&45 %
Enterprise Mfg. Co. dis 50&10 @ 30 %
Clark's dis 33½ @ 35 %
Tapes, Measuring.—American. dis 25&10
Spring dis 40 %
Thermometers, Tin Case dis 60 @ 80&10 %
Timble Skeins.—See Skains.
Ties, Bale.—Steel Wire, Stan'd list, dis 50&10&15
Tinners' Shears, &c.
Shears and Snips (P. B. & W.) dis 20 @ 25 %
Punches—See Punches.
Snips, J. H. Milson & Co. dis 33½ %
Wire.
Stamped, Japanned & Pieced, list Jan. 2, 1893:
Tire Benders, Upsetters, &c. dis 70&10 @ 70&10&15
Stoddard's Lightning Tire Upsetters dis 15 %
Detroit Perfectoed Tire Bender dis 15 %
Tobacco Cutters dis 20&10 @ 30 %
Champion Wood Co. (Champion) ¢ dos \$5.00 @ \$5.25
All Iron ¢ dos \$4.45
Nashua Lock Co.'s ¢ dos \$12.00, dis 50 @ 55 %
Wilson's dis 55 %
Sargent's ¢ dos \$24, dis 55&10 %
Acme ¢ dos \$20.00, dis 40 %
Crocker's ¢ dos \$20.00, dis 40 %
Wollensla's Patents Iron Bronzed dis 50 %
Reiber's bronzed Iron Rods list Jan. 1, 1887, dis 60&2 %
Reiber's Real Bronze or Nickel Plate, list Jan. 1, 1887 dis 60&2 %
Excellor dis 50&10&2 %
Shaw's dis 50&10 %
Payson's Universal dis 40 @ 40&10 %
Tri and Star dis 50 %
Traps.
Game—
Newhouse dis 35 @ 40&15 %
Oneldin Pattern dis 70 @ 70&2 %
Game, Blake's Patent dis 40&10&2 %
Mice and Rats.
Wooden Choker ¢ dos holes 11¢13¢
Mouse, Round Wire ¢ dos \$1.50, dis 10 %
Mouse, Cage, Wire ¢ dos \$2.50, dis 10 %
Mouse, Catch—em-alive ¢ dos \$2.00, dis 15 %

Moose, "Bonanza"	gross \$10 net
Mouse Delusion	gross \$18.00, dis 15 %
Rat, "Decoy"	gross \$16.00, dis 10 %
Ideal	gross \$11
Cyclone	gross \$5.35
Hotchkiss Metallic Mouse, 5-hole trade	dos 90¢
In full cases	dos 75¢
Trawlins—Lothrop's Brick and Plastering	dis 25 %
Reed's Brick and Plastering	dis 25 %
Diston's Brick and Plastering	dis 25 %
Pearce's Plastering	dis 25 %
Clement & Maynard's	dis 20 %
Rose's Brick	dis 15 %
Bragge's Brick	dis 25 %
Worral's Brick and Plastering	dis 20 %
Gerrish's Butter and Cheese	dis 25 %
Trucks, Warehouse, &c.	dis 25 %
B. & L. Block Co.'s List, 1883	dis 40 %
Tubes, Boiler.—See Pipe	
Twine.	
No. 9, Flax Twine, ¼ and ½ Balls	BC. 80¢
No. 18, " " "	" 25¢
No. 24, " " "	" 25¢
No. 36, " " "	" 15¢
No. 36, " " "	" 10¢
No. 264, Matgrass, ¼ and ½ Balls	dis 50¢
Chalk Line, Cotton	dis 15 ¢
Mason Line, Linen	dis 25 ¢
2-Ply Hemp, ¼ and ½ Balls (Spring Twine)	dis 13 ¢
2-Ply Hemp, 1 lb Balls	dis 15 ¢
3-Ply Hemp, ¼ and ½ Balls	dis 11 ¢
Cotton Wrapping, 5 Balls to lb	dis 15 ¢
2, 3, 4 and 5 Ply Jute, ¼ Balls	dis 10 ¢
Wool	dis 6 ¢
Paper	dis 1 ¢
Cotton Mops—6, 9, 12 and 15 lb to doz	dis 15 ¢
Vises.	
Box Lock	dis 60 ¢
Fisher & Norris Double Screw	dis 15-10 ¢
Stephens'	dis 25 ¢
Parker's	dis 20 ¢
Wilson's	dis 55 ¢
Howard's	dis 40 ¢
Bonney's	dis 40-10 ¢
Milton's	dis 40 ¢
Trenton	dis 40-5 ¢
Merrill's	dis 15-30 ¢
Sargent's	dis 60-10-10 ¢
Backus and Union	dis 40 ¢
Double Screw Lee	dis 15-10 ¢
Frontis	dis 20-25 ¢
Saw Vices Adjustable	dis 40 ¢
Saw Vices.	
Bonney's Nos. 2 & 3	dis \$15.00, dis 4 ¢ 10 ¢
Stearn's	dis \$34-10 ¢ \$34-10-10 ¢
Stearn's Silent Saw Vices	dis 35 ¢
Sargent's	dis 60-10-10 ¢
Hopkins'	dis \$17.50, dis 10 ¢
Washington	dis 20-10 ¢
Combination Hand Vice	dis gro, \$43.00
Cowell Hand Vices	dis 20 ¢
Bauer's Pipe Vices	dis 10 ¢
Wagon Boxes.	
Per lb.	dis \$4.00, dis 25 ¢
Wagon Jacks—Daisy	dis \$4.00, dis 25 ¢
Washer Cutters.	
Johnson's Patent	dis \$12.00, dis 40-10-10 ¢
Johnson's	dis \$11.00, dis 35 ¢
Penny's	dis Fol. fig; Jan'd, fig. dis 6 ¢
Appleton's	dis \$16.00, dis 60-10 ¢
Bonney's	dis 30-10 ¢
Washers.	
Size	5-16 ¾ ¾ ¾ ¾ 1
Fashers	7 64 48 32 24 34 34
In less than 200 lb, ½ doz, add ¼¢, 5-lb boxes 1¢ doz	
list	
Wedges—Iron	dis 5 ¢
Steel	dis 4 ¢
Weil Buckets, Galvanized.	
Hill's	dis 13 qt., \$4.25; 14 qt., \$4.50
Iron Clad	dis 14 qt., \$4.50; 16 qt., \$4.75
Whiting's Patent Band	dis \$2.00, dis 25 ¢
Whiting's Wired Top	dis \$4.00, dis 25 ¢
Weil Wheels—5 in., \$3.35; 10 in., \$2.70; 12 in., \$2.37.	
Wire.	
Iron.	
Market Br. & Ann. Nos. 0 to 18	dis 70-10-27 ¢
Market Copper Wire, No. 0 to 18	dis 70-10-27 ¢
Market Galvanized Nos. 0 to 18	dis 65-25 ¢
Market Tin'd Tinned steel Nos. 0 to 18	dis 67-74 ¢
Stone Br. & Ann'd. Nos. 16 to 18	dis 72-74-75 ¢
Stone, Bright & Ann'd. Nos. 19 to 26	dis 75-76-75 ¢
Stone, Br. & Ann'd. Nos. 27 to 36	dis 76-10-25 ¢
Stone, Tin'd Tin'd list, Nos. 18 to 36	dis 70-10-27 ¢
Tinned Broome Wire, Nos. 18 to 24	dis 70-25 ¢
Tinned Broome Wire, Nos. 25 to 36	dis 75 ¢
Annealed Fence, Nos. 8 & 9	dis 75 ¢
Annealed Grape, Nos. 10 to 14	dis 75 ¢
Brass, lat. Jan. 18, '84	dis 15 ¢ 30 ¢
Copper, lat. Jan. 18, 1884	dis 20 ¢ 25 ¢
Barb Fence	See Trade Report
Wire on Spools	dis 65 ¢
Main's Patent Tinned Wire on Spools	dis 65 ¢
Cast Steel Wire	dis 60 ¢
Subs Steel Wire	\$6.00 to 2, dis 30 ¢
Steel Music Wire, Nos. 12 to 30	dis 65 ¢
Picture Wire	dis 60-10 ¢
Barb Wire Safety Guards	\$1000 \$6.00, dis 25 ¢
Wire Cloth	dis 10 ¢
Wire Cloth Netting, &c.	dis 70-10 ¢
Painted Screen Cloth, No. 34, ½ 100 sq ft.	\$1.00
Painted Screen Cloth, No. 35, ½ 100 sq ft.	\$2.00
Galvanized Wire Netting	dis 70-10 ¢
Wire Goods.—See Bright Wire Goods.	
Wire Rope.—List May 1, 1886	dis 33 ¢
Wrenches, American Adjustable	dis 40-10 ¢
Baxter's Adjustable "A"	dis 40-10 ¢
Baxter's Diagonal	dis 40-10 ¢
Coe's Genuine	dis 55-25 ¢
Coe's "Mechanics"	dis 55-10-25 ¢
Girard Standard	dis 70-10 ¢
Machinists, Sterling Wrench Co	dis 70-10 ¢
Lamson & Sessions' Engineers	dis 70-10 ¢
Lamson & Sessions' Standard	dis 70-10 ¢
Girard Pattern Wrought	dis 80 ¢
Girard Agricultural	dis 80 ¢
Lamson & Sessions' Agricultural	dis 80 ¢
Sterling Wrought	dis 80 ¢
Bemis & Call's Patent Combination	dis 35 ¢
Bemis & Call's Merrick's Pattern	dis 35 ¢
Bemis & Call's Standard	dis 35 ¢
Bemis & Call's Cylinder or Gas Pipe	dis 40-25 ¢
Bemis & Call's No. 8 Pipe	dis 35-25 ¢
Aiken's Pocket (Bright)	\$6.00, dis 50-10 ¢
The Favorite Pocket (Bright)	dis \$4.00, dis 40 ¢
Webster's Patent Combination	dis 25 ¢
Boardman's	dis 25 ¢
Always Ready	dis 25 ¢
Donohue's Engineer	dis 60 ¢
Acme, Bright	dis 60-25 ¢
Acme, Nickeled	dis 60-25 ¢
Walker	dis 55-25 ¢
Diamond	dis 40 ¢
Diamond Patent Steel	dis 40 ¢
Wingers, Glasgow	dis 40 ¢
List Jan. 10 1888, \$2.50 off.	
Wrought Goods.	
Staples Hooks, &c. is Jan. 12, '87, dis 50-25 ¢	50-25 ¢

CURRENT METAL PRICES.

OCTOBER 17, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.		
Bar Iron from Store.		
Common Iron:		
1/2 to 2 in. round and square.	1/2 lb	1.90 @ 2.00¢
1 to 6 in. x 1/2 to 1 in.	1/2 lb	2.10 @ 2.2¢
Refined Iron:		
1/2 to 2 in. round and square.	1/2 lb	2.30 @ 2.4¢
1 to 6 in. x 1/2 to 1 in.	1/2 lb	2.30 @ 2.4¢
1 to 6 in. x 1/2 and 5-16	1/2 lb	2.30 @ 2.4¢
Rods—1/2 and 1-1/2 round and sq.	1/2 lb	2.30 @ 2.4¢
Bands—1 to 6 x 3-16 to No. 12.	1/2 lb	2.30 @ 2.4¢
"Burden Best" Iron, base price.	1/2 lb	3.00 @ ...
Burden's "H. B. & S." Iron, base price.	1/2 lb	2.80 @ ...
"Ulster"	1/2 lb	3.10 @ ...
Norway Rods	1/2 lb	4.00 @ 5.00¢

Merchant Steel from Store.		
Per pound.		
Open-Hearth and Bessemer Machinery.		
Toe Calk, Tire and Sleigh Shoe, base price in small lots.	3/4¢	@ 3¢
Best Cast Steel, base price in small lots.	3/4¢	@ 9¢
Best Cast Steel Machinery, base price in small lots.	5/4¢	@ 5¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.		
Common American. R. G. Cleaned.		
10 to 16.	1/2 lb	2.75 @ 2.80¢
17 to 20.	1/2 lb	2.85 @ 3.00¢
21 to 24.	1/2 lb	3.00 @ 3.10¢
25 and 26.	1/2 lb	3.20 @ 3.50¢
27 and 28.	1/2 lb	3.35 @ 3.75¢
29.	1/2 lb	3.50 @ 4.00¢
B. E.		
Galv'd, 14 to 20.	1/2 lb	4.50 @ 4.85¢
Galv'd, 21 to 24.	1/2 lb	4.75 @ 5.12¢
Galv'd, 25 to 28.	1/2 lb	5.12 @ 5.48¢
Galv'd, 29.	1/2 lb	5.62¢ @ 5.85¢
Galv'd, 30.	1/2 lb	6.00 @ 6.25¢
Patent Planchet.	1/2 lb	10¢ @ 10¢
Russia.	1/2 lb	9 1/4¢ @ 10¢
American Cold Rolled B. B.	1/2 lb	5¢ @ 7¢

English Steel from Store.		
Per lb.		
Best Cast.	1/2 lb	15¢
Extra Cast.	1/2 lb	16 1/2¢ @ 17¢
Swaged, Cast.	1/2 lb	16¢
Best Double Shear.	1/2 lb	15¢
Blister, 1st quality.	1/2 lb	12 1/4¢
German Steel, Best.	1/2 lb	10¢
2d quality.	1/2 lb	9¢
3d quality.	1/2 lb	8¢
Sheet Cast Steel, 1st quality.	1/2 lb	15¢
2d quality.	1/2 lb	14¢
3d quality.	1/2 lb	12 1/4¢

METALS.		
Tin.		
Banca, Pigs.	1/2 lb	25¢
Straits, Pigs.	1/2 lb	25¢
English, Pigs.	1/2 lb	24 1/4¢
Straits in Bars.	1/2 lb	26¢

Tin Plates.		
Charcoal Plates—Bright.		
Melvin Grade.	1/2 lb	6.00 @ 6.25¢
"	1/2 lb	6.25 @ 6.50¢
"	1/2 lb	6.00 @ 6.25¢
"	1/2 lb	12.50 @ 13.00¢
"	1/2 lb	7.50 @ 7.75¢
"	1/2 lb	7.75 @ 8.00¢
"	1/2 lb	7.50 @ 7.75¢
"	1/2 lb	15.50 @ 16.00¢
"	1/2 lb	5.75 @ 6.00¢
"	1/2 lb	7.25 @ 7.75¢
Call and Grade.	1/2 lb	6.00 @ 6.25¢
"	1/2 lb	6.25 @ 6.50¢
"	1/2 lb	6.00 @ 6.25¢
"	1/2 lb	7.50 @ 7.75¢
"	1/2 lb	7.75 @ 8.00¢
"	1/2 lb	7.50 @ 7.75¢
Allaway Grade.	1/2 lb	5.75 @ 6.00¢
"	1/2 lb	6.50 @ 6.75¢
"	1/2 lb	5.87 1/2¢ @ 6.25¢
"	1/2 lb	6.25 @ 6.50¢
"	1/2 lb	6.50 @ 6.75¢
"	1/2 lb	7.75 @ 8.00¢
"	1/2 lb	7.50 @ 7.75¢
"	1/2 lb	13.00 @ 13.50¢
"	1/2 lb	12 1/2¢ @ 13¢
"	1/2 lb	6.00 @ 6.25¢

Coke Plates—Bright.		
Steel Coke.—IC, 10 x 14, 14 x 20.	1/2 lb	5.00 @ 7.65¢
"	1/2 lb	7.50 @ 7.65¢
"	1/2 lb	10.25 @ 10.50¢
BV Grade.—IC, 10 x 14, 14 x 20.	1/2 lb	4.70 @ 5.75¢
Charcoal Plates—Terne.		
Dean Grade.—IC, 14 x 20.	1/2 lb	4.25 @ 4.50¢
"	1/2 lb	9.25 @ 9.50¢
"	1/2 lb	5.02 1/2¢ @ 5.25¢
"	1/2 lb	11.37 1/2¢ @ 11.75¢
Abecarne Grade.—IC, 14 x 20.	1/2 lb	4.50 @ 4.75¢
"	1/2 lb	9.00 @ 9.25¢
"	1/2 lb	5.50 @ 5.75¢
"	1/2 lb	10.80 @ 11.00¢

Tin Boiler Plates.		
IX, 14 x 26.	112 sheets.	\$12.50 @ \$12.75
IX, 14 x 28.	112 sheets.	12.75 @
IX, 14 x 31.	112 sheets.	14.25 @
Copper.		
Duty: Pig. Bar and Ingot, 4¢; Old Copper, 3¢ 1/2 lb.		
Manufactured (including all articles of which Copper is a component of chief value), 4¢ 1/2 ad valorem.		
Ingot.		
Lake.		@ 18 1/4¢
"Anchor" Brand.		@ 18¢

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Sheet and Bolt.		
Weights per square foot and prices per pound.		
Not wider than	Not longer than	And longer than
Over 64 oz.	32 to 64 oz.	16 to 32 oz.
14 to 16 oz.	12 to 14 oz.	8 to 10 oz.
Less than 8 oz.		
30—72	25 25	26 27
30—72	25 25	26 28
36—96	25 25	27 29
36—96	25 25	28 30
48—96	25 25	29 31
48—96	25 25	30 32
60—96	25 25	31 33
60—96	25 25	32 34
84—96	26 27	33 35
84—96	27 28	34 36
Over 84 in. wide	28 30	

All Bath Tub Sheets.	16 oz.	14 oz.	12 oz.	10 oz.
Per pound.	\$0.53	0.30	0.32	0.35
Bolt Copper, 1/2 inch diameter, and over, per pound.				
Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.				
Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.				
Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.				

Copper Bottoms, Pits and Flats.		
Per pound.		
14 ounce to square foot and heavier.		28¢
12 ounce and up to 14 ounce to square foot.		29¢
10 ounce and up to 12 ounce.		31¢
Circles less than 8 inches diameter 2 cents per pound additional.		
Circles over 13 inches diameter are not classed as Copper Bottoms.		

Tinning.		
Tinning sheets on one side, 10, 12 and 14 x 48 each.		8¢
Tinning sheets on one side, 30 x 60 each.		30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each.		15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 60 in.), each.		12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 60 in.), each.		12¢
Tinning sheets on one side, other sizes, per square foot.		2 1/4¢
For tinning both sides double the above prices.		
Planished Copper.		
Planished Copper List May 5, 1888.		Net

Planned Copper.		Planned Copper.			
Planned Copper List May 5, 1888		.....Net			
Brass and Copper Tubes.					
Seamless Copper.		Seamless Brass.			
1/2	inch 1/2 lb.	50¢	1/2	inch 1/2 lb.	47¢
3/4	"	44¢	3/4	"	41¢
1	"	42¢	1	"	39¢
1 1/4	"	40¢	1 1/4	"	37¢
1 1/2	"	38¢	1 1/2	"	36¢
1 3/4	"	37¢	1 3/4	"	34¢
2	"	34¢	2	"	31¢

Roll and Sheet Brass.		
Discount from list.		10 @ 15¢
Spelter.		
Duty: Pig. Bars and Plates, \$1.50 100 lb.		
Western Spelter.		5 1/2¢ @ 6¢
"Bergenport"		5 1/2¢ @ 6¢
"Bertha"		7 1/4¢ @ 8¢

Zinc.		
Duty: Sheet, 2 1/2¢ 100 lb.		
600 lb casks.		6 1/2¢ @ 7 1/2¢
Per lb.		7 1/2¢

Lead.		
Duty: Pig. \$2 100 lb. Old Lead, 2¢ 100 lb. Pipe and Sheets, 3¢ 100 lb.		
American.		5 1/2¢ @ 6¢
Newark.		5 1/2¢ @ 6¢
Bar.		6 1/4¢ @ 6 1/2¢
Pipe, subject to trade discount.		7 1/4¢
Tin-Lined Pipe, subject to trade discount.		15¢
Block Tin Pipes, subject to trade discount.		45¢
Sheet, subject to trade discount.		8¢

Soldier.		
1/2 @ 1/4 (Guaranteed).		10¢
Extra Wiping.		18 1/4¢
The prices of the many other qualities of Soldier in the market indicated by private brands vary according to composition.		

Antimony.		
Cookson.	1/2 lb	13 1/4¢ @ 14¢
Hallett's.	1/2 lb	11 1/4¢

Plumbers' Brass Work.		
Ground Bibbs and Stops.		Discount per cent.
Ground Stops, Hydrant Cocks, &c.		55¢ @ 10¢
Corporation Cocks.		55¢ @ 10¢

Corporation Cocks, "Mueller" Pattern, from Western list.	55¢ @ 10¢
Ground Basin and Shampooing Cocks.	50¢ @ 10¢
Compression Basin Cocks.	50¢ @ 10¢
Compression Basin and Sink Cocks.	50¢ @ 10¢
Compression Pantry Cocks.	50¢ @ 10¢
Compression Double Basin and Shampooing Cocks.	50¢ @ 10¢
Compression Double Bath Cocks.	50¢ @ 10¢
Compression Bibbs, Urinal Cocks, Fill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks.	50¢ @ 10¢
Basin Plugs and Basin Grates.	55¢ @ 10¢
Bath and Wash Tray Plugs.	55¢ @ 10¢
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets.	55¢ @ 10¢
Basin Clamps, Basin Joints and Strainers.	55¢ @ 10¢
Boiler Couplings, Ground Face, per set \$1.25.	dis 10
Boiler Couplings, Plain Face, per set \$1.20.	dis 10
Water Back Valves and Plain Couplings, Soldering Nipples and Unions.	55¢ @ 10¢
Union Joints.	60¢ @ 10¢
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides.	55¢ @ 10¢
Hose Goods.	55¢ @ 10¢

Steam and Gas Fitters' Brass and Iron Work.		
		Discount per cent.

Brass Globe Valves.	60¢ @ 10¢
Finished Brass Globe Valves, with Finished Brass Wheels.	40¢ @ 10¢
Brass Globe Valves, with Patent Wood Wheels.	60¢ @ 10¢
Brass Globe Angle and Corner Valves.	60¢ @ 10¢
Brass Radiator Angle Valves.	60¢ @ 10¢
Brass Radiator Angle Valves, Frink's Patent.	60¢ @ 10¢
Brass Cross and Check Valves.	60¢ @ 10¢
Brass Check Valves.	60¢ @ 10¢
Brass Hose Valves.	60¢ @ 10¢
Brass and Iron Frink Valves.	60¢ @ 10¢
Brass Safety Valves.	60¢ @ 10¢
Brass Vacuum Valves.	50¢ @ 10¢
Brass Whistle Valves.	60¢ @ 10¢
Brass Balance, Back Pressure and Foot Valves.	50¢ @ 10¢
Brass Butterfly and Throttle Valves.	50¢ @ 10¢
Brass Pump Valves.	50¢ @ 10¢
Brass Steam Cocks.	57 1/2¢ @ 10¢
Brass Service, Meter and Union Meter Cocks.	57 1/2¢ @ 10¢
Brass Whistles, Water Gauges and Oil Cups.	60¢ @ 10¢
Brass Hollow Plug, Tallow and Globe Oil Cups.	50¢ @ 10¢
Brass Lubricators.	60¢ @ 10¢
Brass Air Valves.	60¢ @ 10¢
Brass Air Cocks.	60¢ @ 10¢
Brass Gauge Cocks.	55¢ @ 10¢
Brass Cylinder Cocks and Steam Bibbs.	50¢ @ 10¢
Brass Swing Joints and Expansion Joints.	50¢ @ 10¢
Brass Test Pumps.	50¢ @ 10¢
Brass Steam Fittings, Rough.	60¢ @ 10¢
Brass Steam Fittings, Finished.	20¢ @ 10¢
Brass Union Joints.	60¢ @ 10¢
Brass Soldering Unions and Nipples.	55¢ @ 10¢
Brass Hose Fittings, Fusible and Boiler Plugs.	55¢ @ 10¢
Iron Body Globe, Angle, Cross and Check Valves.	65¢ @ 10¢
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves.	65¢ @ 10¢
Iron Cocks, all Iron.	65¢ @ 10¢
All Iron Valves.	65¢ @ 10¢

Miscellaneous.		
		Discount per cent.
Cast Iron Fittings.		70¢ @ 10
Plugs and Bushings.		75¢ @ 10
Malleable Iron Unions.		67 1/2¢
Malleable Iron Fittings.		25

Paints.		
Black, Lamp—Coach Painters'.	1/2 lb	22 @ 24¢
" Ordinary.		6¢
Black, Ivory Drop, fair.	12 @	15¢
" best.		23¢
Black Paint, in oil, kegs, 8¢; assorted cans, 11¢.		
Blue, Prussian, fair to best.	40 @	55¢
" in oil.	45 @	55¢
" Chinese dry.		70¢
" Ultramarine.	18 @	30¢
Brown, Spanish.		14¢
" Van Dyke.	10 @	12¢
Dryers, Patent American, ass'd cans, 9¢; kegs, 7¢.		
Green, Chrome.	15 @	25¢
Green, Chrome in oil.	14 @	18 @ 25¢
Green, Paris.	good, 20¢; best, 25¢	
Green, Paris in oil.	good, 30¢; best, 35¢	
Iron Paint, Bright Red.	1/2 lb	24¢
Iron Paint, Brown.	1/2 lb	14¢
Iron Paint, Purple.	1/2 lb	14¢
Iron Paint, Ground in oil, Bright Red.	1/2 lb	61¢
Iron Paint, Ground in oil, Red.	1/2 lb	61¢
Iron Paint, Ground in oil, Brown.	1/2 lb	61¢
Iron Paint, Ground, Purple.	1/2 lb	61¢
Litharge.		61¢
Mineral Paints.	2 @	4¢
Orange Mineral.		10¢
Red Lead, American.		61¢
Red Venetian (Eng.) dry.	\$1.65 @	\$1.70
Red Venetian in oil.	ass'd cans, 11¢; kegs, 8¢	
Red Indian Dry.	9 @	12
Rose Pink.		10 @

THE IRON AGE

THURSDAY, OCTOBER 25, 1888.

A New Oil Cup.

Messrs. Pedrick & Ayer, 1025 Hamilton street, Philadelphia, Pa., are bringing out the new form of oil cup shown on this page. The engravings give a good idea of the appearance and construction of the device. Fig. 1 is a rod oiler, the top of which screws on, or can be made to slip on and be held by a spring catch. Fig. 2 is a guide oiler, the cover of which has a small vent hole in the top to admit the air to facilitate feeding the oil, and also to allow it to be taken off readily. Fig. 3 is a section view of the rod cup, showing the internal arrangement. This is the same in all the cups. The bracket-shaped piece in the interior of the cup is split open. It is wedged apart at the time that the screw is cut, so that it always, even after long use, clamps the spindle and holds it in any de-

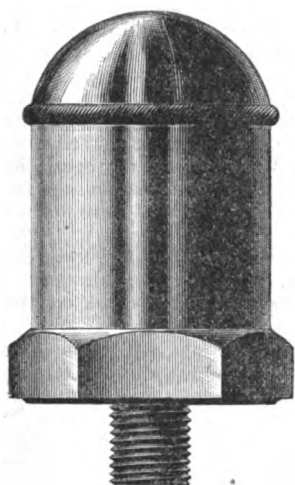


Fig. 1.—Rod Oiler.

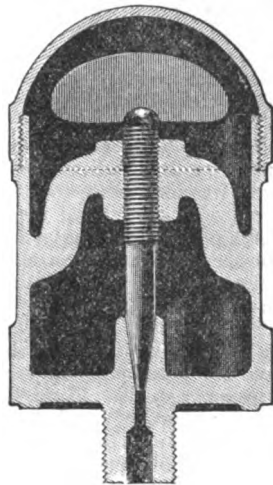


Fig. 3.—Section of Rod Oiler.

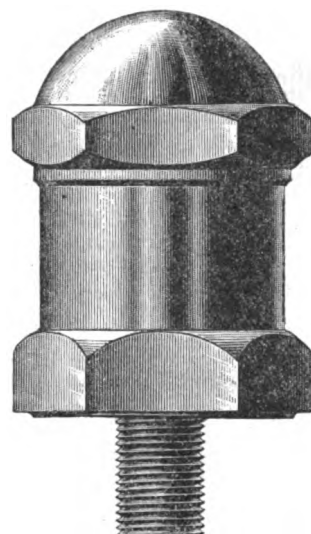


Fig. 2.—Guide Oiler.

NEW OIL CUP, MADE BY MESSRS. PEDRICK & AYER, PHILADELPHIA, PA.

sired position, without the aid of jam-nuts or binding screws. Around the upper edge of the cup are marks by which the engineer can adjust the opening to feed the required amount, according to the temperature of the weather and the quality of oil used. When the engine is out of use, it is only necessary to screw down the spindle and the flow of oil entirely stops. The oilers are made in two sizes. A cup, similar to the guide cup, for locomotive truck brasses is made. These oil cups are in very extensive use by the Northern Pacific and the Philadelphia and Reading R. R. Companies, and are claimed to be superior to any other cup ever used. The spindle is easily manipulated and remains in any desired position; no extra tools are needed for adjustment, and they can be easily cleaned out, there being plenty of room for that purpose.

The Philadelphia and Reading Coal and Iron Company have commenced to make use of the sinking fund to cancel the mortgages on its lands. Some time ago the Board of Management directed that 10 cents per ton on all coal mined for the lands owned by the company should be set aside as a sinking fund to be used either in the acquisition of additional lands or in liquidating coal land bonds and mortgages. When some of these bonds were purchased

mortgages were allowed to remain. On the 1st of next month the company will pay off and cancel a divisional mortgage on the Raudenbush tract. The amount is \$110,000, and the property covers 1100 acres.

Flow of Steam in a Tube.

Through an oversight, a more extended reference to Mr. C. H. Peabody's paper on "Flow of Steam Through a Tube," presented last week before the American Society of Mechanical Engineers, was omitted from our last issue.

The paper was a record of some experiments on the flow of steam made in the mechanical engineering laboratory of the Massachusetts Institute of Technology. The tube used in these experiments was of brass 0.275 inch internal diameter and 8 inches long. At the entrance end a plate,

plied with a good steam gauge and with a thermometer in a long brass cup filled with oil. The gauges were compared with a mercury column and the thermometers were calibrated and their freezing and boiling points were determined. The exhaust steam was condensed in a small surface condenser and weighed in a tank.

The experiments were begun after the apparatus had been running steadily for some time and lasted about half an hour. Steam for the experiments was drawn from the main steam-pipe, and, as the supply-pipe had a drip near the apparatus, which remained open during an experiment, it was assumed that the quality of the steam was the same as that in the main pipe. A large number of experiments with different types of calorimeters gave 1½ to 2 per cent. of moisture in the steam. Later experiments with a new

1½ inches in diameter, was driven on flush with the end of the tube, and the orifice was well rounded to avoid contraction. This tube led from an iron pipe 6 inches in diameter and 2 feet long. The brass tube discharged into another iron pipe 6 inches in diameter and 2 feet long, which formed a chamber in which the steam came to rest, and from which it was led to a surface condenser. The two pieces of 6-inch pipe were capped on the outer ends, and had flanges on the inner ends, between which was a plate holding the experimental tube. The whole apparatus was lagged on the outside, and the plate holding the brass tube was covered on both sides with about 4 inches of asbestos to prevent the flow of heat from one part of the apparatus to the other.

Steam was led to the apparatus by a lagged pipe 1 inch in diameter and away from it to the condenser by a pipe of the same size. Each of these pipes had a valve near the apparatus. The valve in the supply-pipe was used merely to shut off the steam when the apparatus was not in use, and, during an experiment, it was wide open, so that the pressure in the first 6-inch tube was full boiler pressure or nearly so. The valve in the exhaust-pipe was manipulated to maintain the desired difference of pressure between the two parts of the apparatus. Each chamber of the apparatus was sup-

plied with a good steam gauge and with a thermometer in a long brass cup filled with oil. The gauges were compared with a mercury column and the thermometers were calibrated and their freezing and boiling points were determined. The exhaust steam was condensed in a small surface condenser and weighed in a tank.

As the more recent data were not available till the work was nearly complete, the moisture was assumed to be 2 per cent. in all the calculations. The error from this source is inconsiderable. The data and results of the experiments are given in the following table:

	Pressure of steam in front of tube.	Pressure of steam beyond tube.	Difference of pressures.	Flow of steam per hour by tank in pounds.	Flow of steam per hour, calculated in pounds.	Gt. Gc.
1.....	69.1	4.4	64.7	239.0	182.3	1.260
2.....	69.6	9.7	59.9	230.4	211.2	1.091
3.....	71.3	14.8	56.5	242.0	233.4	1.037
4.....	69.1	19.4	49.7	232	242.2	0.958
5.....	70.0	24.5	45.5	234.5	256.6	0.914
6.....	70.3	29.1	41.2	229.0	261.5	0.876
7.....	72.00	34.2	37.8	232.0	268.9	0.860
8.....	72.00	39.5	32.5	221.4	268.9	0.830
9.....	71.6	44.2	27.4	216.5	260.1	0.833

The table will be readily understood from the headings. The ratio of the actual

quantity to the calculated quantity, if the theory were entirely applicable to this case, should resemble the coefficient of flow for water through a short pipe, and should not be greater than unity. The marked, though regular increase of this ratio with the increase of the difference of pressure, and the fact that, for the larger differences, this ratio is larger than one, shows conclusively that some of the assumptions are inadmissible. It is not improbable that heat is given by the steam to the tube at the admission end, and regained by the steam toward the exit end. Such an interchange must influence both the condition of the steam at the orifice and the rate of flow. The well-known phenomena of cylinder condensation and re-evaporation in steam-engines show that such an action may be energetic. It is also possible that the length of the tube is not sufficient to insure a steady flow. It is noticeable that the weight of steam discharged by the tube has a maximum, which is for a difference of pressure of about 35 pounds by theory, and for a difference of pressure of about 55 pounds by experiment. All the work of experiment and calculation was done by Mr. G. Buttolph.

Specifications for Steel Rails.

In our report of the meeting of the American Institute of Mining Engineers, at Buffalo, we referred briefly to a paper read by R. W. Hunt, of Chicago, Ill., on "Steel Rails and Specifications for Steel Rails." Passing over that part of it which deals with the history of their manufacture and with the question of the form of modern heavy sections, we may quote those parts of the paper which are explanatory of the provisions of the specifications.

We will assume the section selected to be the best possible; it now remains for the maker to furnish a good rail rolled to it. The character of the permanent way of the railroads of the United States is improving each year. Consequently the demand that the mills shall deliver their rails well finished and straight in all directions is much more imperative than in the past. Of course, absolute accuracy in so gross a product is both unnecessary and impossible, but practical accuracy is attainable.

I consider it of the utmost importance that most of the straightening shall be done while the rails are hot. In other words, that the hot straightening shall be conducted so as to leave the minimum work for the cold press. Every blow of the gag is a bid for a break. The harder the steel the greater the danger. Moreover, gagging is apt to take out one bend by putting in two others, thus endeavoring to have two wrongs make a right. To bring the breaking danger down as low as possible, the cold straightening should be done before the rails are absolutely cold. At the same time if the rail goes under the cold press too hot the steel will not possess elasticity, and each blow will leave a dent; and if excessively applied the rail will be either wavy or lumpy. Such rails will of course make a rough track. Some mills in taking side bends out of their rails apply the gag to the flange. I cannot approve of this, and believe that it greatly increases the danger of broken rails. But after the rails are delivered to the trackmen they should not be carelessly thrown from the cars. This was not the practice with the early steel rails. The drilling should be accurate, and if proper drill presses and drills are used it can be done. If the holes are to be anything, from $\frac{3}{8}$ under to $\frac{1}{8}$ over size, I do not see any use in naming the diameter in the specifications.

So long as the purchasers of rails exact a guarantee from rail makers, I think the chemical composition of the steel should be largely left with them. But if the purchaser believes that carbon is the best hardening element for steel, it is not unreasonable to ask for as much as the maker is willing to put in, knowing what proportions of other elements his metal will contain, and still guarantee his rails. No doubt as the sections are increased harder steel can be safely used. The mere replacing of a broken rail with a whole one may fall far short of the damage sustained by the road on whose track the accident has occurred, leaving the danger to human life out of consideration. Therefore the purchaser has a right to insist upon some precautions being taken to avoid as far as possible such disasters. And these precautions, if correct ones, are also in the interest of the makers. Steel rails are made very rapidly, and the demands of the trade necessitate that they shall be made very cheaply. The workmen are paid by the piece, and while generally making good wages, they must produce a large tonnage to realize them. No matter how desirous the general management may be of producing only good work, it is very necessary that safe guards should be provided. Most makers have these in some form, but there are mills where the chances are taken.

The tests which I prefer are those I used for 15 years at Troy. My experience gives me confidence in them. I do not wish to say that Troy rails have never broken in service, but such accidents have been very infrequent, and could almost always be traced to individual mechanical causes. This plan of making tests has the merit of furnishing a check on the grade of the steel early in its manipulation; and I consider it more convenient than any drop test, and at least equally efficient.

As may be generally known, the Troy works have for years made a very wide range of Bessemer steels. From 0.05 per cent. to 1 per cent. of carbon; and we were fortunate enough to have considerable reputation for our success in so doing. On the higher grades, where great accuracy was required, it was my practice to have a test ingot taken to represent every 15-inch ingot cast. This accomplished two results—it made the workmen careful and let us know of any variations which might occur. I do not think this extra precaution necessary in making rail steel in any works where ordinarily good practice prevails, and I should most certainly discourage any of my clients from contracting for rails with others.

As has been proven by the fracture of many ingots, the steel in cooling, if the ingot is left upright until the interior steel sets, will form a funnel-shaped cavity in its top end. But if the ingot is thrown upon its side before that metal has solidified, this cavity will extend lengthwise, the distance being limited by the condition of the interior steel. Hence it is manifest that ingots should not leave an upright position before the metal has set sufficiently to prevent this cavity from so extending. Everything is against this lengthwise defect being taken out by the subsequent rolling of the ingot, and it will most probably cause pipes and cold shuts in the rails; but if the cavity is maintained at the top end of the ingot it can be cut off. Again, if ingots are drawn too soon from the pit and thrown upon their sides, there is danger of the crust which has formed at the top end breaking and permitting the interior liquid steel to escape or "bleed." That will certainly make a pipe.

It is only from sound and compact ingots that we can hope to produce good rails. Such ingots only can be made by care in casting them. Therefore, the careful steel-maker will not only use good molds, but also exercise a close supervi-

ion over the manner of pouring the heats. When from any cause this is not or cannot be done the resulting ingot should not go into No. 1 rails. Nearly every manufacturer uses somewhat different sized ingots, and frequently they vary in their shape. Of course each one follows the practice which under the controlling circumstances seems to yield the best results. It is well known that the same length ingot will not always roll equally well. I have found, when the metal was cracking badly in the blooming rolls, good results to be at once obtained by pouring the ingot shorter. Of course this is easily explained, and points to the necessity of closely watching and controlling the temperature of the "blow" in the converter. And I fully believe that a strong influence on the quality of the resulting steel rests at this very point.

As every ingot, if properly handled, has more or less of a cavity at its top end, therefore the bloom rolled from it will be piped or spongy at that end. To be certain of having a sound rail made from the upper part of the ingot, a sufficient length must be cut off to remove this spongy steel. These pieces need not necessarily be treated as scrap, there being many purposes for which they will answer.

It is not necessary for me to tell this institute that care should always be exercised in heating steel. As the carbon is increased, so is the danger. I believe more unsatisfactory rails can be traced to over-heat in the furnace than to any other one cause. I commend our fellow-member William Metcalf's paper, "Steel; its Properties; its Use in Structures and in Heavy Guns," read before the American Society of Civil Engineers March 2, 1887, to the careful consideration of every steel maker and user. It is, in my judgment, worthy to be considered a text-book on the treatment of steel.

My investigations of the service of thousands of tons of rails, and the analyses of many hundreds of them, have shown the greatest variation in the wear of rails of the same section and chemical composition. This being so, there must be some physical cause. Can we find a chemical reason for rails showing "soft" in wear, having the following chemical composition?

Carbon.....	0.39
Sulphur.....	.059
Phosphorus.....	.085
Manganese.....	.722

If so, why did another make, in the same track and under seemingly the same conditions, analyzing as follows, wear "hard?"

Carbon.....	0.40
Sulphur.....	.064
Phosphorus.....	.080
Manganese.....	.779

I could multiply these instances to an indefinite extent, but will not take up time. Our Bessemer friends are all right on their chemistry. They know a great deal more than the people who made those early good rails, and it is not in that direction that investigation is most needed.

As I said early in this paper, every rail-maker wants to give his customers good rails. Now, I honestly believe it is to his interest that the purchaser should be represented by intelligent inspection. No matter how good the mill organization may be, the men all work by the ton, and do not always realize the importance to their own interests (which are the same as their employers), that only good work should go out. Hence, the right kind of inspection is of assistance to any mill. If I were a purchaser of rails, I should draw fuller specifications than these, which I now have the honor to present to you, and I should accept all the risk of the results. But railway managers are not yet willing to assume this position. I have, therefore, endeavored—while not relieving the makers of any responsibility, or intro-

ducing novel practices—to assist the railroads in obtaining better and more uniform rails.

It is recognized as the commercial rule that rail-makers should give a guarantee with their rails. In these specifications I have embraced such an one as is given by some of the largest makers in the country, and under which they have sold rails for many years. It seems to me to be fair in its provisions, and I believe the other requirements of my specifications will tend largely in the direction of making the sellers safe in the guarantee. If this is so, the railroads will, of course, receive satisfactory rails, and everybody ought to be happy.

HUNT'S SPECIFICATIONS FOR STEEL RAILS.

Section.

SECTION 1.—The section of the rail rolled shall conform to the template furnished by the railroad company with an allowance in height of 1-64 inch under, and 1-32 over, being permitted in a delivery of 10,000 tons of rails. The fit of the fishing or "male" template shall be maintained perfect.

SEC. 2.—The weight of the rail shall be kept as near to pounds per yard as is practical after complying with Section 1.

Lengths.

SEC. 3.—The standard length of rail shall be 30 feet at a temperature of 60° F. Shorter rails of lengths will be accepted to the extent of 10 per cent. of the entire order. A variation in length of ¼ inch longer or shorter than the above specified lengths will be allowed.

Finish.

SEC. 4.—The rails must be free from all mechanical defects and flaws, and shall be sawed square at the ends, and the burrs made by the saws carefully chipped and filed off; particularly under the head and on top of the flange. In sawing care must be taken to avoid a flow of steel which will produce a swell on the top of lower flange, as the rail lies under the saw, thereby affecting the fit of the fish-plate.

SEC. 5.—The rails shall be smooth on the heads, straight in all directions, both surface and line, and without any twist, waves or kinks, particular attention being given to having the ends without kinks or drop. The hot straightening shall be carefully done, so that gagging under the cold press will be reduced to the minimum, and so applied that the rails shall not be made "lumpy."

Drilling.

SEC. 6.—Circular holes 1 inch in diameter shall be drilled through the web at 12 inches from the bottom of the flange. The center of the first hole 12 inches from the end of the rail; and 12 inches from the center of the first to the center of the second hole, and so on if more than two holes are required. These holes must be accurate in drilling in every respect, and left without burrs.

Branding.

SEC. 7.—The number of the charge, the name of the maker, the month and year of manufacture, shall be marked in plain letters and figures on the side of the web of the rail in such a position as not to be covered by the fish-plates when laid in the track. If the purchaser prefers, the number of the charge shall be stamped on the end of the rail.

Percentage of Carbon.

SEC. 8.—The steel to contain as high a percentage of carbon as the maker is willing to put in and still meet the requirements of sections 9 and 21.

Tests.

SEC. 9.—While the heat is being cast, two (2) test ingots shall be made. The first from steel going into the first regular ingot, the other from metal representing the last one. These test ingots shall be 3 x 3 inches and not less than 4 inches long. From them bars at least ½-inch square shall be drawn at one heat by hammering. Each bar when cold shall be bent, without breaking, by the blows of a sledge to not less than a right angle. Should one bar from a heat fail and the other stand the test, a third bar may be taken from a bloom rolled from the same ingot represented by the failed bar. If this stands the test it shall be accepted in lieu of the failed one. If the makers choose, more than the two test ingots may be taken, but they must be from the steel of the first and last regular ingots. If this is done and a test bar fail, another one may be drawn from the duplicate ingot and tested, and if it stands, accepted.

Treatment of Ingots.

SEC. 10.—After the ingots are cast they shall be either constantly kept in an upright position until ready to be rolled, or else so maintained until the interior steel has had time to solidify.

SEC. 11.—No "bled" ingots, or ingots from "chilled" heats shall be used in the manufacture of rails under this contract.

SEC. 12.—No ingots from badly teemed heats shall be used, excepting as they shall be subject to the provisions of section 16.

Cutting of Blooms.

SEC. 13.—After cutting off, or allowing for the "sand" or top end of each ingot, at least 12 inches more of seemingly solid steel shall be cut off that end of the bloom, or partially formed rail; if the latter, then the pieces so cut off shall equal 12 inches in length of a 7 x 7 inch bloom; a greater length than 12 inches being preferred; and if after cutting such length the steel does not look solid, the cutting shall continue until it does.

Heating.

SEC. 14.—Care shall be taken to avoid overheating the steel in shape of either ingots or blooms; and under no circumstances shall a "cinder" heat be allowed—that is, a heat high enough to cause the cinder to run off the steel as it is being drawn from the furnace. This does not apply to cinder which may be sticking to the under side of the steel, when drawn from a horizontal furnace, or to the bottom of an ingot when drawn from a soaking pit.

Inspection.

SEC. 15.—Inspectors representing the purchaser shall have free entry to the works of the makers at all times while this contract is being filled, and shall have all reasonable facilities afforded to satisfy them that the rails are being made in accordance with these specifications. The makers shall furnish them with the carbon determinations of each heat, if so required.

SEC. 16.—The inspectors shall have power to reject rails made from insufficiently sheared blooms, or from heats the test pieces of which have failed, or from badly poured heats, or from "chilled" heats, or from "bled" ingots. The rails made from uncut blooms, if otherwise perfect, to be received as No. 1 short rails, if sufficient lengths have been sawed off to make an amount of steel equal to the original demand of 12 inches. The rails made from heats, the test pieces of which have failed, may be accepted as No. 2 rails. The rails from a badly poured heat may be received as No. 2 rails, but, if made from a "chilled" heat or "bled" ingot, to be absolutely rejected. By an imperfectly poured heat is meant one which from any cause has been teemed without the control of the operator. A "chilled" heat is one which, from the steel chilling, has to be either pricked or poured over the top of the ladle. A "bled" ingot is one from the center of which the liquid steel has been permitted to escape.

SEC. 17.—Imperfectly drilled, straightened or chipped or filed rails shall be rejected, but will be accepted after being properly finished.

SEC. 18.—Rails failing to comply with section 1 will be rejected as No. 1 rails.

No. 2 Rails.

SEC. 19.—The requirements of No. 2 rails shall be the same as for the No. 1, excepting they will be accepted with a flaw in the head not exceeding ¼ inch, and flaws in the flanges not exceeding ½ inch in depth, and may have been made from an imperfectly poured ingot or heats from which the test bars have failed.

SEC. 20.—No. 2 rails to the extent of per cent. of the whole order will be received.

Guarantee.

SEC. 21.—The rail makers to guarantee the No. 1 rails against breakage and unusual wear at the ends or elsewhere for five years from the time of delivery to the railroad company; and should any such rails so fail, will, upon the return of such failed rails to their works, deliver free of cost on cars at their works perfect rails to replace such failed rails. The failure of which is not attributable to improper laying or want of care after being laid, or unusual circumstances of derailment from failure of other railway machinery or appliances, or negligence of the railroad company's employees. In event of failure at the ends or elsewhere of the No. 1 rails, not exceeding 10 per cent. of the amount of the contract before the expiration of five years' guarantee (and when the rails in all other respects warrant such a course), the railroad company will cause to be cut off so much of such rails as may be necessary to make perfect rails of them, but in no case leaving them less than feet in length, the maker to pay in cash for cutting, redrilling and reststraightening such rails. The loss in weight so sustained by the railroad company to be made up to them by the makers on the return to them of the pieces so cut off in good and perfect full-length rails of such section as may be agreed upon. The points of delivery of failed rails, ends of rails cut off and rails to replace the same, or mode of such settlement, may be varied to conform to the peculiarities of each contract.

A Copper Syndicate Contract.

We reproduce below one of the contracts between the famous copper syndicate and one of the Lake Superior mining companies:

Agreement made this 19th day of April, in the year 1888, by and between the Atlantic Mining Company, of New York, a corporation organized and existing under the laws of the State of Michigan, hereinafter called the sellers, and La Société Industrielle Commerciale des Métaux de Paris, hereinafter called the buyers, witnesseth: The parties hereto having, in consideration of the sum of \$1 to each of them in hand paid by the other at or before the enrolling and delivery of these presents, the receipt whereof is hereby acknowledged, and for other good and valuable considerations to them thereunto moving, mutually agreed together as follows:

1. The sellers herein agree to sell, and hereby do sell, to the buyers the entire copper output of their mines for about three years, commencing May 1, 1888, and ending December 31, 1890, estimated at 4,500,000 pounds of refined copper for each of the three years, and at all events not to exceed this amount per year, deliveries by sellers during 1888 not to exceed two-thirds of the above stipulated amount.

2. The price of such copper to be 13 cents per pound cash on delivery in New York, and in addition such sum as shall be equal to one-half the net profits realized above this price on resales thereafter made of said copper as hereinafter provided.

3. The copper is to be made by the sellers and delivered to the buyers in any shape or shapes or sizes ever made by the Detroit and Lake Superior Copper Company, which the buyers may desire and designate according to schedules to be furnished to the sellers by the buyers through Jere Abbott & Co., of New York, provided such sizes can be made of the company's mineral by the smelting works, but in the absence of schedules the copper is to be put into ingots.

4. The copper shall be delivered by the sellers in New York City free on board ship or at warehouse for storage as the buyers may direct.

5. Under the sole direction and control of the buyers, the sellers, when so requested, will act for them without charge or commission in selling, invoicing and collecting payments for any of this copper which the buyers desire to be resold in the United States, and such copper may be forwarded directly from the smelting works to any required point, the delivery of same at New York as provided in article fourth being waived by the buyers.

6. Payments to the sellers by the buyers hereunder shall be made cash on delivery or on tender of the shipping or storage documents—namely, bill of lading or warehouse receipt and Detroit and Lake Superior Mining Company's certificate of weight.

7. The copper shall be produced and delivered as nearly as possible in equal monthly quantities.

8. The sellers are not to be held responsible for failure to deliver at any time caused by strikes of workmen in their own employ or in the employ of others, accidents at the mines or works, lack or interruption of transportation or any other causes beyond their control.

9. It is also understood that the estimate of production herein stated is greater than the average annual production of the sellers mines, and, on this account, the sellers are not to be held liable for failure to deliver the full quantity herein mentioned, provided there shall be any failure of production of the mines.

10. Any deficiency of production in any one year is not to be added to the production of the following year; but this applies

only to deficiency of production and not to delay in transportation.

11. Upon the execution and delivery of this contract, the buyers agree to deliver to the sellers a letter of credit of satisfactory bankers for amount of all purchases under this contract, down to May 1, 1889, which letter of credit shall provide for payment by the bankers, on tender or delivery to the bankers of the documents above specified; such letter of credit to be availed of by the sellers for such portion of the copper as is not resold through them in the United States; and at least 30 days before May 1, 1889, the buyers shall furnish to the sellers an additional letter of credit, which shall be similar in form and substance and cover all purchases made and delivered hereunto until May 1, 1890, and at least 30 days before May 1, 1890, the buyers shall furnish to the sellers an additional and similar letter of credit covering the balance of all purchases and deliveries made under the said contract; it being understood and agreed that the sellers will not draw on or against any of the credits so given except after demand of payment on the buyers or their agents and default therein. It is further understood that in no one month shall the said credit be drawn against for an amount greater than the contract price of the proportionate delivery of copper for such month under this contract.

12. The sellers agree to guarantee all the sales that shall be made by them hereunder for the buyers, such guarantee to extend only to a guarantee of the cost price to the buyers of said copper under this contract, but no further; it being the intention hereof that to the extent which the sellers resell the said copper for the buyers, they shall release the said buyers from any further obligation to account to them therefor, but the said sellers, in case of loss by any such sales, shall not be bound to compensate the said buyers for any loss of profit arising to them thereby.

13. The sellers in addition to the price of 13 cents per pound, herein agreed to be paid by the buyers for copper delivered hereunder, shall be entitled to receive from the buyers one-half of the net profits that shall accrue by reason of resales of the said copper either by the sellers as agent for the buyers or by the buyers either in the United States or elsewhere after deducting storage, ocean freight, insurance, charge for interest at the rate of 6 per cent., and all other charges, including brokerages, but no commission shall be charged by either party for effecting such resales.

14. The said sellers shall render monthly accounts of all productions of their mines and of all resales made by them hereunder as the agents of the buyers, and the buyers shall also account for all resales made by them; and settlements of profits arising from resales by either party shall be made quarterly.

15. Messrs. Jere Abbott & Co., of New York City, are hereby nominated as agents for the buyers to receive for them notice of shipments and demand of payment, and to give direction as to the delivery, and to receive tenders, and to direct as to resales, and to receive shares of profits arising by said resales, and generally to act for the said buyers in all matters in connection with this agreement; and on the failure of the said Jere Abbott & Co. to act as such agents, the bankers named in said letters of credit shall be considered and hereby are acknowledged as agents of the buyer for those purposes.

16. It is further mutually agreed between the buyers and the sellers that all matters of differences arising with reference to the obligations of this contract or the interpretation thereof shall be submitted to three arbitrators resident within the United States, one of whom shall be appointed by the buyers, another of whom

shall be appointed by the sellers, and a third of whom shall be selected by the two arbitrators thus appointed, and that the said arbitrators shall promptly hear, and a majority of them determine, all such questions of difference and make their award in writing, which award shall be binding upon the parties hereto.

In witness whereof the said Atlantic Mining Company of has caused these presents to be sealed with its corporate seal, and the same to be subscribed in duplicate by its treasurer, and the Société Industrielle et Commerciale des Métaux de Paris has.

ATLANTIC MINING COMPANY,
By JOHN STANTON, Treasurer
SOCIÉTÉ INDUSTRIELLE ET
COMMERCIALE DES MÉTAUX.
E. SECRÉTAN, Administrateur-Directeur.

Identification of Dry Steam.

A paper of special value, presented at the Scranton meeting last week of the American Society of Mechanical Engineers, was by Mr. James E. Denton, on "The Identification of Dry Steam." We take pleasure in publishing in this issue several of the engravings which accompanied it, and need, perhaps, scarcely say that the interest attached to the subject makes its further consideration eminently desirable. The paper, as we explained in a brief reference to it in our report of the Scranton meeting of the society, was divided into two parts, the first dealing with experiments with steam jets, from the appearance of which the character of the steam was determined approximately, and the second giving general expressions for the instrumental errors of condensing calorimeters for testing the quality of steam. We will confine ourselves here to the first part alone which bears directly upon the published illustrations. Figs. 1 to 5, we would explain, are reproduced from photographs of steam jets under different conditions.

It will be understood that Mr. Denton's method of recognizing dry, slightly wet, or slightly superheated steam, consists in the scrutiny of a jet of steam flowing into the atmosphere. Mr. Denton explained that if a boiler can be made to generate steam which is a few degrees superheated, then by drawing off steam at the end of a pipe of sufficient length the loss of heat by the pipe may be made to so nearly equal to the amount of the superheating that the steam will issue from the pipe in exactly the saturated condition. In the case of these experiments, this method was adopted to obtain dry steam.

A 30 horse-power Harrison steam boiler, Fig. 6, was used, which, when not forced to its utmost steaming capacity, superheated its steam from 6° to 12° F. To the top of the steam space of this boiler an inch pipe, *a*, *a*, *a*, about 40 inches long was attached as shown in the figure. This pipe led to a 1½-inch tee, *b*, to which were connected the several outlets used and the thermometer and steam gauge A. At B was a stop-valve, and at C another thermometer and steam gauge. All of the pipe *a* up to the tee was heavily protected against loss of heat by asbestos paper, 2 inches of hair felt and canvas. When the thermometer C showed 8° of superheating, the loss of heat from the pipe would make thermometer A show 2° of superheating, both steam gauges A and C showing exactly the same pressure.

By raising the water in the boiler to the top of the gauge-glass and increasing the quantity of steam generated by the boiler, the superheating at thermometer A could be made to vary from 2° F. to zero, and the steam referred to herein as dry steam was such steam as flowed through the pipe *a* when thermometer A showed less than

2° but more than 0° of superheating, with reference to the pressure common to the gauges at A and C respectively.

Experiment 1.—The tee *b* was fitted at its under side with a draining pipe terminating in a petcock. Into its ends were screwed ¾-inch pipe plugs prepared as follows (see Fig. 7): The square hub to which a wrench is intended to apply was turned off, and a hole ⅜ inch in diameter drilled through the center of the plug. A hole ⅞ inch in diameter was then drilled in the inside end of the plug, so as to leave a thickness of metal at the outer end of ⅞ inch. The ⅞-inch hole is then practically an orifice in a "thin plate," and removes the possibility of any of the heat of steam flowing through it, being employed in overcoming friction against the passages leading to the point where the steam issues into the atmosphere. Thus arranged, dry steam at 55 pounds gauge pressure flows into the atmosphere of a boiler room in a jet which is perfectly transparent over about ¼ inch of distance from the orifice. Fig. 5 shows a jet for 95 pounds gauge pressure.

Experiment 2.—For the thin orifice in the end of tee *b* there was substituted a piece of ¼-inch gas-pipe, *d*, Fig. 8, about 4 inches long, upon which was mounted a hollow copper drum, *e*, about 3 inches diameter and ¾ inch in length. On the outer end of the gas-pipe was a brass cock, *f*, 2 inches long. The bore of the pipe and cock was about ⅜ inch. The drum *e* was fitted to receive a stream of water at *g* and allow it to flow off at *h* after subjecting the pipe *d* to a certain refrigerating effect. Thermometers at *g* and *h* graduated to fifths of a degree F., determined the temperature of the water at its entrance and exit to the condenser. The thin orifice at the side of the tee shows the transparency of the "dry steam" for ¼ inch from the orifice. The jet issuing from the cock *f* is a bluish-white color clear up to the orifice, due to the cooling loss of heat in passing through the 6 inches of ¼-inch pipe and cock.

Upon passing water through the condenser so as to maintain it at an average temperature of 74½° F., the end jet became distinctly white, the jet at the side certifying by its unchanged appearance that the steam operated upon was also unchanged in quality. The heat abstracted per minute was determined to be 12.75 British thermal units. The steam flowing* per minute was determined to be 1.13 pounds. The latent heat of steam at 55 pounds gauge pressure being 822 British thermal units, 1.13 pounds of steam would possess 929 units of latent heat, which if completely absorbed by refrigeration would cause the 1.13 pounds of steam to become liquid water at the temperature corresponding to 55 pounds pressure. Hence the absorption by the circulating water of the 12.75 British thermal units may be assumed to cause $\frac{12.75}{929} \times 100 = 1.4$ per cent. of the steam to liquefy.

Fig. 1 shows the effect of circulating iced water through the cooling drum, thereby maintaining it at an average temperature of 54° F. The heat abstracted per minute was 18 British thermal units, the flow of steam was practically the same, so that the view exhibits the appearance of a jet of steam at 55 pounds pressure containing 1.94 per cent. of liquid water. A jet at 95 pounds gauge pressure being maintained at 76° F., 26.27 thermal units were abstracted from it per minute, and the flow of steam was 1.75 pounds per minute. Fig. 2 exhibits the appearance of this jet, which by the above data contains 1.88 per cent. of water.

*This was determined by attaching cock *f* to a Wheeler surface condenser, S, and determining the flow for a period of about half an hour, and weighing the condensed steam by a spring balance, K.

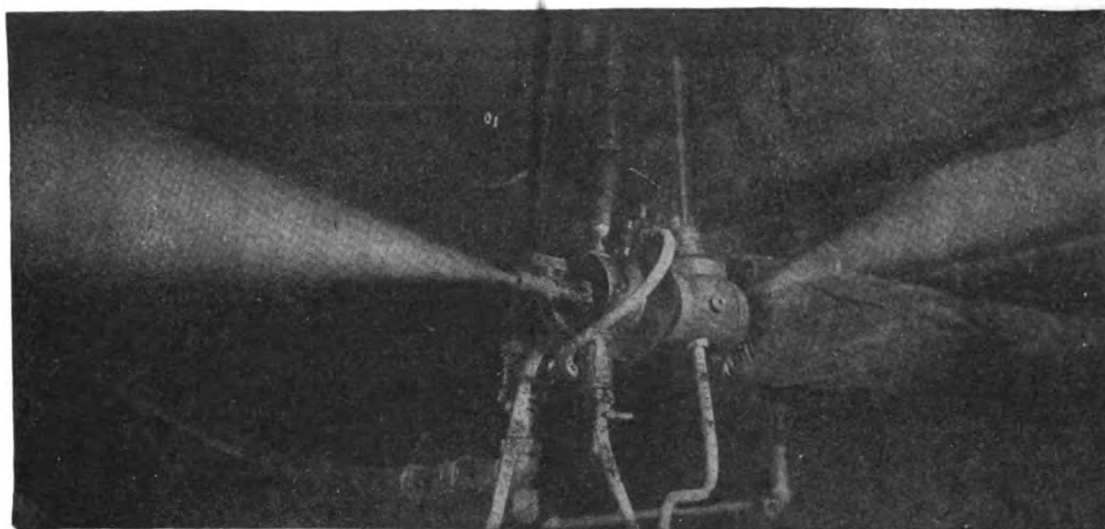


FIG. 1.—Steam at 55 Pounds Pressure Containing 1.94 per cent. Water.

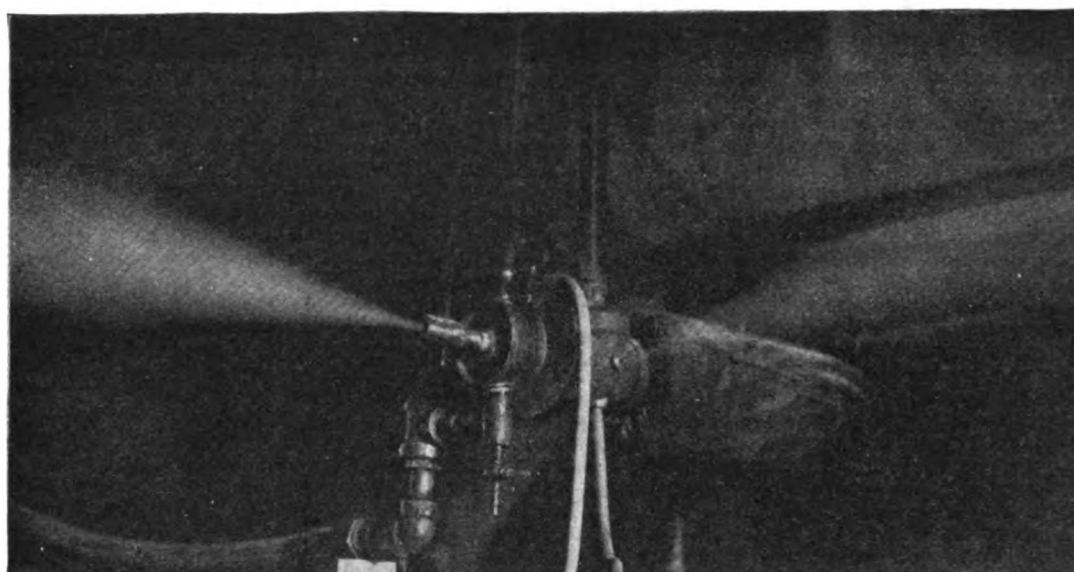


FIG. 2.—Steam at 95 Pounds Pressure Containing 1.88 per cent. Water.

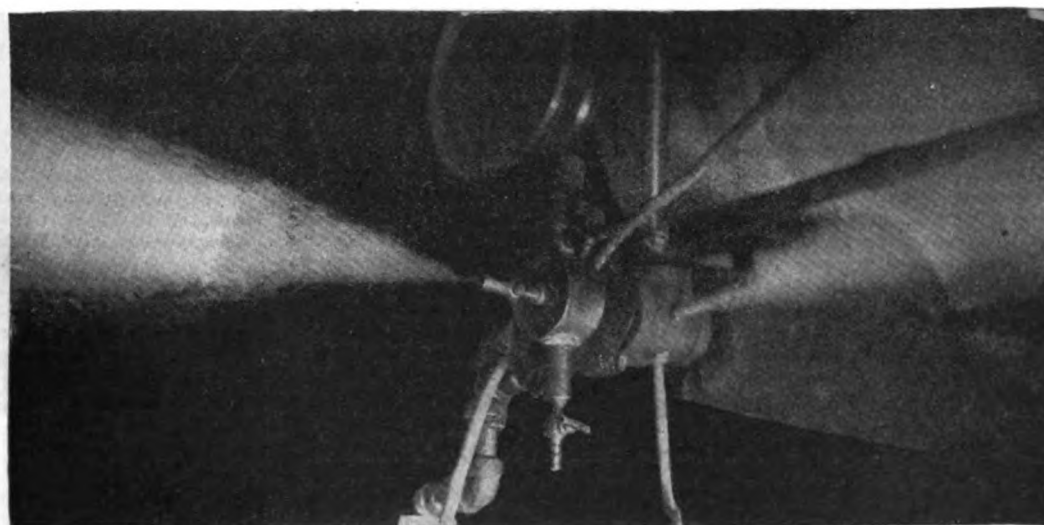


FIG. 3.—Steam at 55 Pounds.—Boiler Priming Violently.

PHOTOGRAPHIC REPRODUCTIONS OF STEAM JETS.

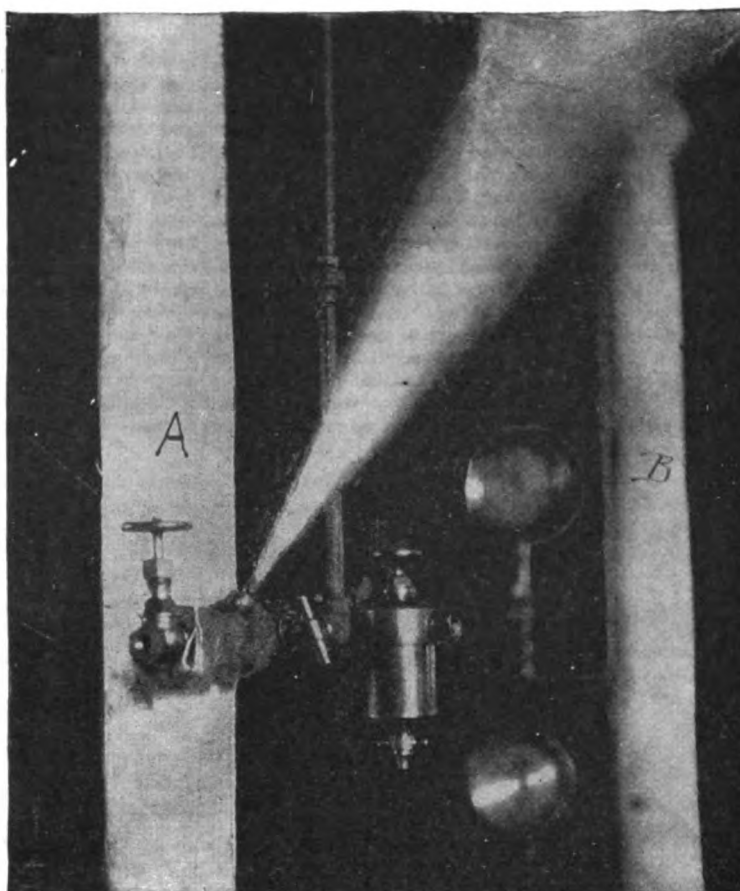


FIG. 4.—Dry Steam after Traversing 100 Feet of Covered Pipe at Velocity of 50 Feet Per Second.

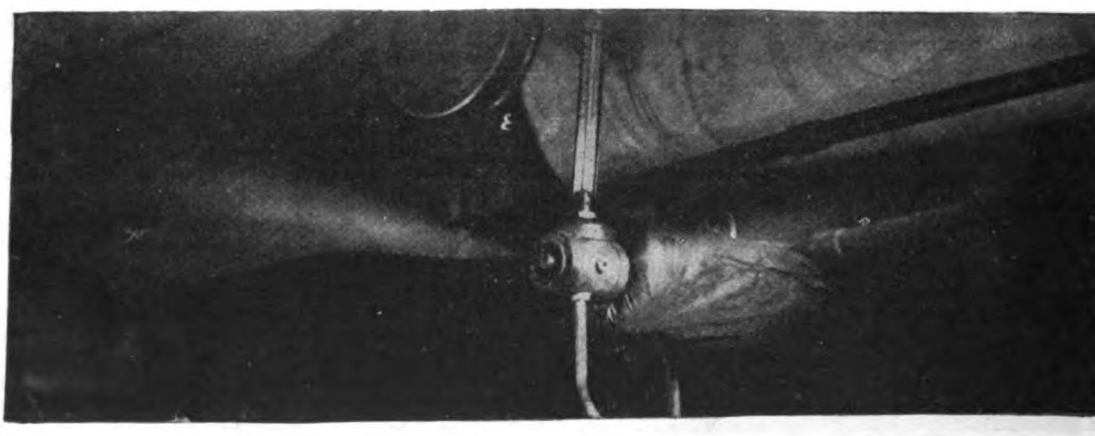


FIG. 5.—Dry Steam at 95 Pounds Pressure.

PHOTOGRAPHIC REPRODUCTIONS OF STEAM JETS.

Experiment 3.—Jets of dry steam at 55 pounds being uniformly flowing, the level of the water in the boiler was gradually raised beyond the top of the water-glass until the water was about 8 inches from the top of the steam space of the boiler, when periodical gusts of white mist commenced to occur in both the end and side jets, and engines taking steam from the boiler received so much water in their cylinders that they could no longer run with safety. A view of one of such gusts was made by magnesium flash light with the result shown in Fig. 3. While the feed pump was working, the priming denoted by these gusts continued. The jet returned to steady action and normal appearance within a few seconds after the feed pump was stopped, notwithstanding that the boiler was almost completely full of water.

Experiment 4.—The boiler being steadily making steam 8° superheated and supplying the same to an engine through about 100 feet of 2½-inch pipe, newly felted with 1 inch thickness of hair felt, a jet of steam was made to blow through a petcock about 2 feet above the throttle valve on

the investigation that jets of steam show unmistakable change of appearance to the eye when steam varies less than 1 per cent. from the condition of saturation either in the direction of wetness or superheating.

The mathematical investigation showed that the instrumental error of portable condensing calorimeters does not theoretically interfere with the measurement of about 1 per cent. of variation in the heat of saturated steam. But in the use of such calorimeters there has always been found to exist an accidental variation or error considerably in excess of the theoretical instrumental error, even Regnault's magnificent work not being an exception in this respect. Consequently if a jet of steam flow from a boiler into the atmosphere under circumstances such that very little loss of heat occurs through radiation, &c., and the jet be transparent close to the orifice, or be even a grayish-white color, the steam may be assumed to be so nearly dry that no portable condensing calorimeter will be capable of measuring the amount of water in steam. If the jet be strongly white the amount of water may be roughly judged up to about 2 per

which she is helping to replace. With a length between perpendiculars of 175 feet, a breadth of 31 and a mean draft of not quite 12, the Petrel will be supplied with engines of about 1850 indicated horse-power under freed draught, with which she will probably attain a speed of about 13 knots. This machinery is now ready for her, so that it is thought that she will be complete for trial within from two to three months. Like the other new vessels, she is provided with a curved steel deck for the protection of her engines and boilers, and is also divided by steel bulkheads into numerous water-tight compartments, so as to minimize the injury done by the penetration of shot. Her main battery consists of four six-inch, high-power, steel breech-loading rifles, so mounted in sponsons as to have a widesweep. She will also have a secondary battery consisting of two revolving cannon, two rapid-fire guns and a Gatling. She will have a barkentine rig and sail power for ordinary cruising where steam is not required.

Compared with the Charleston and the Baltimore, the Petrel is seen to be a small craft of inferior speed. But her cost is

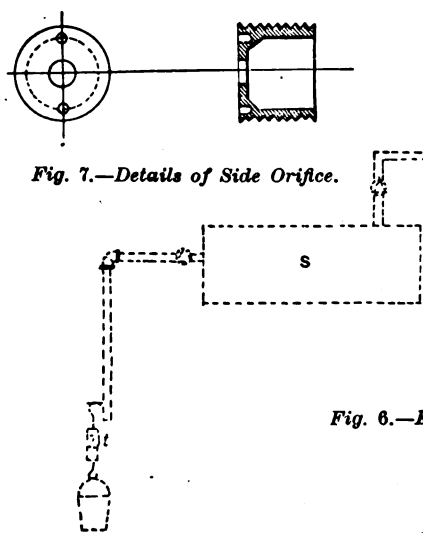
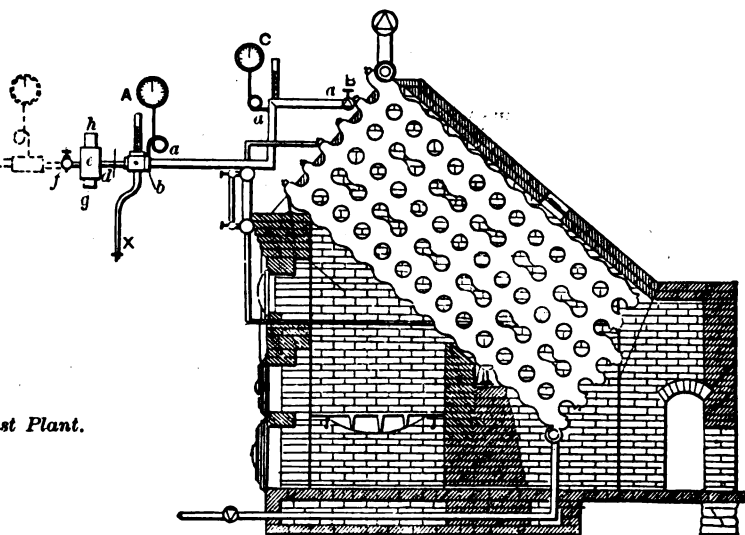


Fig. 7.—Details of Side Orifice.

Fig. 6.—Elevation of Test Plant.



THE IDENTIFICATION OF DRY STEAM.

the steam chest of the engine. Fig. 4 shows the appearance of the steam when the engine was running with a total steam consumption of about 600 pounds of steam per hour. The jet 4 was so laden with water that it flowed with irregular gusts, resembling those occurring when the boiler was priming (Fig. 3), but of less violent character. And yet the boiler was making slightly superheated steam, as proven both by the thermometer at C (Fig. 6) and the transparent appearance of the jets from the apparatus at the boiler. The explanation of this paradox is as follows: The steam pipe to the engine runs beneath the engine foundation from the boiler to a point below the vertical pipe B; thence it rises in B, and finally runs vertically downward to the engine in A. When the engine is stopped, the water condensed by the pipe remains at the bottom of B, and the jet contains only a gray mist. When the engine is running, the water of condensation is swept along with the steam with sufficient power to cause it to be carried up B, and show the wetness of Fig. 4. A valve placed at the lower end of B to drain the water out of the pipe will prevent the wet appearance of the jet in Fig. 4 when a feeble current is passing through A and B, but such drainage fails sensibly to alter the appearance in Fig. 4, when the velocity through the pipe is 50 feet per second.

We will repeat here the conclusions at which Mr. Denton arrived: It appears from

cent, but beyond this a calorimeter only can determine the exact amount of moisture. A common brass pet cock may be used as an orifice, but it should, if possible, be set into the steam-drum of the boiler and never be placed further away from the latter than 4 feet, and then only when the intermediate reservoir or pipe is well covered.

The Gunboat Petrel.

Following the Yorktown, the Vesuvius, the Charleston and the Baltimore, the fifth of the vessels added by Secretary Whitney's administration to the new navy, the Petrel, was recently launched at the yard of the Columbia Iron Works, at Baltimore. The name, one of the prettiest and most suitable that could be given to a small vessel, is not wholly new to our navy, although, we believe, never before conferred in it on a craft expressly constructed as a warship. It was borne both by a small schooner, built like the present vessel in Baltimore, and employed in the Mexican war, and also by a steam vessel purchased from the merchant marine and fitted up with a battery for service in the civil war. But the new Petrel, though having a displacement of only about 885 tons, and classed in the legislation authorizing her construction as a light gunboat, is an effective cruiser, built on an approved modern plan, and capable of better service than some larger vessels of the old navy

only one-fourth that of the former vessel and less than one-fifth that of the latter. It is rather noticeable that for general cruising purposes no other vessels so small have been asked for since the Petrel was authorized in the spring of 1885, and it has been suggested that she may prove to be the only one of her class, as the Dolphin will certainly be the only one of hers. Still, with her light draft and good battery power, the Petrel will no doubt find her sphere of usefulness. The new composite ship, to be used as a practice vessel for the midshipmen of the Naval Academy, will be somewhat near the size and cost of the Petrel. The Vesuvius is also of similar small displacement, but has very high speed. It cannot be long now before the Petrel and her four predecessors will join the four Roach cruisers. The coming winter will probably see the Yorktown, the Vesuvius, the Charleston and the Petrel completed and tried. Indeed, for the future, trial trips rather than launchings will be eagerly watched for, and the results will be of value to Congress in guiding its legislation for new construction during the next session.

The rate on bar iron from the Mahoning Valley, Ohio, and the Shenango Valley, Pa., to Memphis, Tenn., has been reduced 2 cents per 100 pounds. The new rate went into effect on Saturday, the 20th inst., and was made at the request of the New York, Pennsylvania and Ohio Railroad.

THE MECHANICAL ENGINEERS'

SCRANTON MEETING.

Second Notice.

The afternoon of Wednesday, October 17, as outlined in our report last week, was again devoted to excursion to different establishments in Scranton. The first stop was made at the locomotive shops of the Dickson Mfg. Company. The various stages in the erection of locomotives were there exhibited, considerable attention being attracted by the hydraulic flanging of locomotive boiler heads. Other departments of the works, such as the engine erecting shop and the foundry, were also visited, a large Wheelock engine in course of erection in the former exciting particular interest. A special invitation had been issued to visit the works of the Scranton Packing Company, where a refrigerating plant of the absorption type was being tested. The machinery there was examined with a good deal of interest. Perhaps one of the most novel experiences during the trip was the descent into the Pine Brook Colliery and the ascent into the coal breaker. The mine shaft is nearly 300 feet deep. Carriages then conveyed a large number of the party to the works of the Boies Steel Car-Wheel Works. The wheels there turned out consist of cast-iron hubs and steel tires, the wheel disks each being made up of two steel plates securely bolted together, the whole making apparently a very substantial and elastic wheel. The wheel disks are of a peculiar shape calculated to give great resisting power, and are formed in a hydraulic press. All the details of manufacturing the wheels were exhibited and attentively followed.

Wednesday Evening.

The evening session was opened by a paper by Prof. J. Burkitt Webb, on the "Overhauling of a Mechanical Power." Professor Webb undertook to show that there was no such law, or its converse, as that proposed by Professor Ball in his "Experimental Mechanics," in which the following statement is made: "The principle which we have here established (with respect to a differential pulley block) extends to other mechanical powers, and may be stated generally: Whenever rather more than half of the applied energy is uselessly consumed by friction, the load will remain suspended without overhauling."

The paper was briefly discussed by Mr. Oberlin Smith, and was followed by Professor Webb's second paper on "The Mechanics of the Action of the Injector." To this we will refer more in detail in another issue. In the resulting discussion, a communication was read from Mr. Wm. Kent, who took the stand that, while the injector was a poor machine for lifting water, its efficiency was almost perfect, so far as forcing water into a boiler was concerned. Comparing the efficiencies of pumps and injectors, Mr. Denton pointed out that in a pump where there was practically no expansive working of the steam the performance was much superior to the work of an injector, even though for this latter a card might properly be drawn showing a much greater available area of work done.

We omitted to state last week that among the papers presented and discussed on Wednesday morning was one by Mr. F. A. Scheffler, entitled, "A Foundry Cupola Experience." This was a continuation of a paper by the same author, presented at the Nashville meeting of the society, its purpose being to answer the questions raised in discussing it at the time.

In discussing this paper, Mr. W. F. Durfee referred to the waste of fuel, in the

shape of carbonic oxide gas, ordinarily going on in foundry cupolas. This, he explained, was overcome in a new type of cupola by the introduction of a set of auxiliary tuyeres which introduced air at different levels and prevented carbonic oxide from again forming, due to the presence of coal.

Wednesday evening having been specially set down for the discussion on "Steel Phenomena," this subject was then taken up and is presented at length elsewhere in this issue. The session was adjourned at 9.30 p. m. so as to enable the visitors to avail themselves of the invitation extended by the Suburban Electric Railroad Company to go over their electric road, three special cars having been provided for the purposes. It is not without interest to note here that Scranton was the first city east of the Mississippi to build a street car road to be operated exclusively by electricity. Commencing with a capital of \$20,000, and 3 $\frac{1}{2}$ miles of track in December, 1886, the Suburban Company now have over 5 miles in operation, with 20 cars. The first cars were built by the Pullman Company, and were considered at the time the finest street cars in the world. One of them was the show car of the Pullman Company at the Paris Exposition. The success of the Suburban has been followed by the forming of other companies. The Nay-Aug Crosstown commenced running last spring, the South Scranton Passenger Railway this fall. The People's line will soon be changed from horsepower to electricity, when Scranton will have about 25 miles of street railroad operated by electricity.

Thursday, October 18,

was given up wholly to an excursion, a special train leaving Scranton at 9 a. m., having been kindly provided on the Erie and Wyoming Railroad. The first stop was made at Hawley, the silk mills at that place having been thrown open for inspection. The mills are operated by water power and furnished a series of interesting studies. Leaving Hawley the train proceeded to White Mills, where the Honesdale Glass Works were visited. After dinner, which was served at Honesdale, the party were conveyed by the gravity cars of the Delaware and Hudson Company over the Moosic Mountain to Carbondale and back to Scranton through the Upper Lackawanna coal field. The pleasures of this journey at this time of the year, with the wooded mountains in full autumnal glow, can scarcely befitly described, but must be experienced to be fully appreciated. Indications of the great wealth of coal in the region passed through are generally prevalent. In this connection the following short table of coal shipments will, no doubt, be examined with interest:

Coal Shipped from Lackawanna-Wyoming Valley.

	tons.		tons.
1880	11,419,279	1884	15,977,753
1881	13,951,333	1885	16,236,470
1882	18,971,371	1886	17,081,826
1883	15,604,422	1887	19,684,929

The output for the Wyoming region thus far this year, according to the Scranton Board of Trade, is 16,141,451 tons, being now 2,000,000 tons a month. At this rate the output would be over 25,000,000 tons, or fully two-thirds of the entire anthracite product for the year. Every strike in the Lehigh and Schuylkill regions has helped Scranton. To mine this coal, over 50,000 men and boys are furnished steady work the year round, and the companies pay out fully \$4,000,000 cash each month in wages. With such a steady flow of wealth circulating through the arteries of this valley monthly, is it any wonder that its capital city must grow? The magnitude of the coal trade is more easily seen by reducing it to daily proportions. During the month of September there was sent out from the Wyoming

Valley each working day 156,653 tons, equal to 522 trains of 20 cars each of 15 tons capacity. The increase has averaged about 1,750,000 tons yearly.

Though not in accordance with the original programme it was decided to hold

An Evening Session,

thus leaving Friday free so far as the consideration of professional papers was concerned. The session was presided over by Mr. Henry G. Morris, the first business being a number of announcements relative to an invitation which had been received to visit the Scranton Steel Works. The first paper was by Professor Hutton on

THE STRAINS ON AN ANNULAR LID RESISTING INTERNAL PRESSURE.

It appears that the occasion recently arose in Professor Hutton's practice to decide upon the strains in an annular casting, to which a flexible diaphragm was secured, when fluid pressure came normally upon the latter. A large cylindrical vessel, 73 inches in diameter, had to have a lid which could be easily opened, and should be light. It was therefore decided to make this lid of copper sheet, $\frac{1}{4}$ inch thick, and to rivet this copper to a cast-iron ring, which would give the necessary stiffness to secure a steam-tight joint when bolted to the flange of the cylinder, and would allow of arranging a convenient hinge structure.

The interest of such a case to designers generally, and the advantage which it may prove to others to be able to refer to such an analytical investigation, induced Professor Hutton to request Mr. L. H. Rutherford, by whom it was undertaken, to consent to its publication in the society's "Transactions." The paper, we need perhaps scarcely say, was eminently mathematical in character.

There being no discussion, Mr. C. J. H. Woodbury's paper on "Electric Welding" was taken up. To this we referred more fully in our last issue. The paper, we may add here, embraced extensive tables of tests of welded specimens made at the Watertown Arsenal. The machines by which the welding is done were illustrated and described in *The Iron Age* of July 12, 1888. Mr. Woodbury showed a number of very interesting specimens illustrating the capabilities of the process. It may not be amiss to remark here that the Thomson Electric Welding Company, of Lynn, Mass., are applying it largely, and with eminent success, to the welding of carriage-wheel tires.

The discussion was opened by a written communication from Mr. Wm. Kent, who desired to know how it was that a ring could be welded, the natural inference being that the electric current would pass through the unbroken part of the ring in preference to taking the shorter path, embracing the resistance of the disjointed ends. Mr. Woodbury explained that as a matter of fact the greater portion of the current, depending upon the position of the clamps of the welding machine, took the shorter path regardless of the great resistance. Rough figures were given by Mr. Woodbury for the different values, the general nature of the question and the short time at disposal in replying preventing an exact statement. Mr. Oberlin Smith referred to the fact that he had successfully welded together pieces of tin plate, though the action in that case ought perhaps more properly be termed soldering, since the tin coating merely melted, and, on again solidifying, bound the pieces together. Mr. Smith referred also to the possible utility of the electric process in locally heating steel tools for hardening, especially where the parts to be hardened are small projections of relatively very large pieces, as, for example, the cutting points in dies, thus entailing danger of fracture from unequal expansion and con-

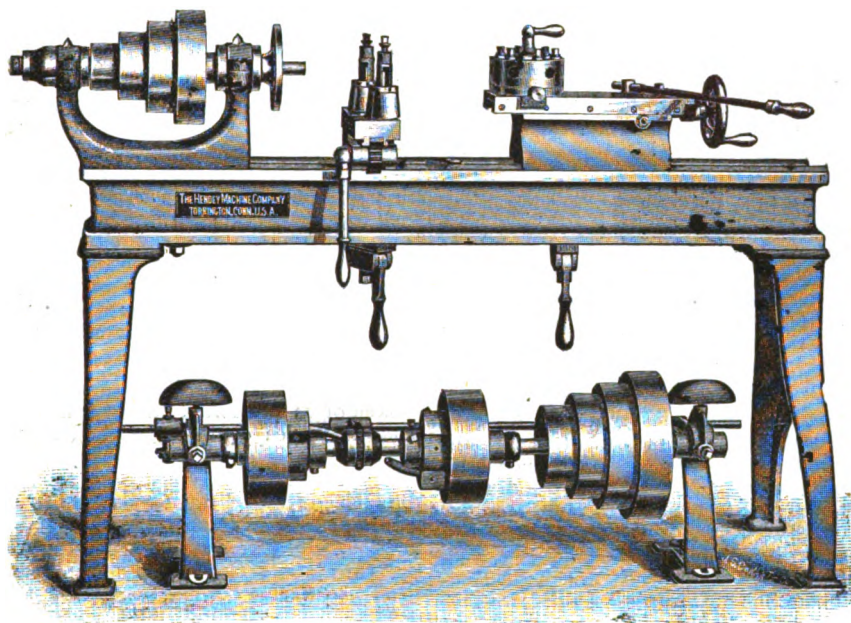
traction in the ordinary process. Attention was further directed to the circumstance that in butt-welding by the electric method the ends of the pieces to be joined were made convex; consequently, the union began at the center and proceeded outward, the flux being forced outward at the same time. Mr. Pope drew attention to the great utility of electric welding in joining electric wires, the union in all cases being perfect and immeasurably superior to the method in current use of twisting together the ends of the wires to be joined and then soldering. Incidentally he touched upon the question which had been raised as to whether iron and steel would be subject to burning when welded in this way, and stated substantially that there was no danger from this source, the temperature being under ready control. Mr. Woodbury, in closing the discussion, spoke, among other things, of a contemplated chain-making machine which would embrace an electric welding attachment.

The list of papers having been exhausted, topical discussions were again taken up,

No agreement exists among the members as far as the prices of Nuts of a certain size are concerned. This is known as a base rate, and includes all products between certain numbers. Nuts below or above this scale are termed extras, and their selling price is not regulated by agreement. As a consequence, there is considerable cutting down by manufacturers in the price of extras. The principal subject of discussion related to this cutting of prices. An effort to regulate the price for the products of all sizes was made by a number of the members. The attempt failed for want of unanimity as to what the fixed rate for each size should be.

New Turret Lathe.

The Hendey Machine Company, of Torrington, Conn., are putting on the market a new 15-inch turret lathe, shown on this page. The lathe is designed to take the place of a more expensive screw machine for a large variety of work. The turret



NEW TURRET LATHE, BUILT BY THE HENDEY MACHINE COMPANY, TORRINGTON, CONN.

the first being that relating to steel phenomena, which, as previously noted, had been commenced at a preceding session. In view of its consideration elsewhere in this issue we will not here refer to it further. A series of topics on power molding machines, bucket curves of modern turbines, speeds of hot-air engines and variation in pitch of screw threads as cut by dies in screw machines were presented but elicited practically no discussion.

A series of resolutions of thanks to the various organizations and committees who had extended courtesies and generally interested themselves in behalf of the society, and its guests closed the meeting. On Friday morning a visit was paid to the Scranton Steel Works. About 120 members were in attendance during the week. The papers and discussions, as usual, were interesting and profitable, and the different excursions were thoroughly enjoyed.

The Bolt and Nut Manufacturers.—The Bolt Manufacturers' Association of the United States held a meeting at the Hotel Anderson, Pittsburgh, on Wednesday, the 17th inst. The Nut Manufacturers' Association met at the same place the day previous. The members of one are also members of the other, but each organization is independent of the other.

side is moved by a lever and has a movement of 6 inches. The turret is revolved by drawing the stop-pin on the side and turning by hand, which is done as quickly as a full automatic turret, and, in some cases, quicker, as it is not necessary to pull the slide back as far as when on small work. The turret slide is also moved by a hand-wheel and screw and is set in the following manner: Take off lever and draw the slide back as far as possible. Tighten the nut on side of foot-block and it is ready for use. This makes a complete hand or speed lathe. The turret has six holes; the cut-off slide has two tool-posts and has adjusting stops for each tool. The turret slide also has an adjusting stop. The spindle has a $\frac{1}{4}$ -inch hole through its entire length and front, and has a Morse taper for center. The boxes are of deoxidized bronze and the spindle is furnished with a face-plate. The weight of the lathe is 700 pounds and the bed measures 5 feet.

The regular monthly meeting of the Bessemer Steel Association was held at the Monongahela House, Pittsburgh, on Tuesday, the 17th inst. The attendance was fair, more than half the members being represented. Business was reported to be in a very satisfactory condition and the

outlook very encouraging. No change was made in prices, nothing but routine business being transacted.

Treasury Decisions.

DUTY ON ADJUSTABLE CHAIN LINKS.

The claim of certain appellants that shackles or chain links are dutiable as malleable iron castings at 2 cents a pound and forgings at $2\frac{1}{2}$ cents a pound instead of 45 per cent. is denied by the Treasury Department, on the ground that the articles in question, which are links for chains with movable bolts, so that the chains can be separated and adjusted by shortening or lengthening, are made wholly of iron, being first forged in a suitable size and shape and then manufactured and finished by further process of boring, &c., after which they are either japanned or galvanized, and that they are not now in the condition known as "forgings of iron."

NAIL FILES.

In a case of nail files the appellants claim that the articles in question are dutiable at the rate of 30 per cent. ad valorem, either as "brushes," under the provision therefor, or by assimilation to "manufactures of bone." The articles it appears were returned by the appraiser as "manufactures of metal and bone," and classified for duty under the provision for "articles * * * composed wholly or in part of * * * metal," which view has been sustained.

BEELTON SHANKS.

Having been assessed at 45 per cent. and the appellants claiming 25 per cent. duty as buttons, or at the rate of 35 per cent. ad valorem for "plated and gilt articles and wares of all kinds." * * * The appraiser reports that the articles commercially known as button-shanks are not button-molds, but small brass cups into which the molds are set in the manufacture of buttons, and which are not of the same character as the "shanks and collets" covered by the Department's decision of May 31, 1888, and are not plated or gilt articles. The assessment of duty is affirmed.

MANUFACTURES OF STEEL.

On an assessment of duty at the rate of 45 per cent. ad valorem on certain so-called "steel forgings" claimed by the appellants to be dutiable at $2\frac{1}{2}$ cents per pound, as forgings of steel, and returned as manufactures of steel. It appears that the merchandise in question consisted of steel wire drawing-plate blanks, which were plates of steel that had been forged into the sizes and shapes desired preparatory to their further manufacture and completion for use as "drawing plates," but had not undergone any such further manufacture. The Department reversing the assessment says: These goods not having been advanced by manufacture beyond the condition of forgings are dutiable as claimed by the appellants.

The Meldometer.—The meldometer, invented by Mr. John Joly, of Dublin, Ireland, is a simple instrument for observing the behavior of bodies at high temperatures, melting points, &c. The instrument fits the stage of a microscope, and consists of a platinum strip stretched between two clamps; a little of the material in a state of powder is put on the strip, a current is sent through it, and the resistance of the system adjusted until melting or boiling ensues. A carbon rod of more than a foot in length is placed vertically in a glass tube, and mercury enters the tube from below when a small reservoir connected with the tube by a piece of india-rubber pipe, is lifted; thus part of or all the carbon is cut out. A tap further serves to arrest or discharge the mercury. It is easy to melt quartz and other refractory material on this platinum strip.

THE WEEK.

An explosion occurred in the great manufactory of the American Pencil Company, in Jersey City, last Saturday. It was caused by the spontaneous combustion of red cedar wood dust, which, passing through the dust arrester, flew from the sawing room to the boiler room. There was a sharp explosion as the flue burst, and the flames flashed 300 feet into the sawdust heap in the boiler room. About 400 girls and men who were at work in the building escaped, with a single exception. The damage is estimated at \$1200.

Pine straw bagging, made from the needles or leaves of the pine tree, finds favor among merchants and shippers at Charleston, and it is predicted that before another season 100 factories will be engaged in its manufacture.

A federation of miners of the Lake Superior district, including men of copper, iron and all other mines of Northern Michigan, Wisconsin and Minnesota, is now being organized.

Japan has nearly 100 daily newspapers. The first was started only 18 years ago.

A new street car motor run with gas made automatically from crude petroleum was exhibited in Chicago last week. The inventor claims that it is capable of a speed of 15 miles per hour, at a cost of less than \$1 per day.

To remedy a quicksand on the West Shore Railroad in what is called the West Point tunnel, Chief-Engineer Katta is putting steel ribs and plates into the excavation for a distance of 140 feet, the former 15 inches wide and the latter 24 inches.

Favored by President Diaz, a New York syndicate have obtained control of the Mexican Mortgage Bank, the President being desirous of attracting American capital rather than European.

Some interesting statistics of the paper trade were given by Warner Miller in an address delivered at a banner-raising in Duane street about a week ago. The paper trade in this country represents a yearly product of nearly \$95,000,000, and the articles made, of which paper is the so-called "raw material," amount to nearly \$100,000,000 yearly. The value of paper is largely made up by the cost of labor in making it, for the various articles from which paper is produced will not average 25 per cent. of its total cost. The duty on writing and fine paper was 35 per cent. to the year 1883. It was then reduced to 25 per cent. See the result. For the fiscal year June 30, 1883, \$55,448 worth of paper was imported, paying a duty of \$19,407; while for the year ending June 30, 1887, there was imported \$968,865 worth of paper, paying a duty of \$242,216—an increase of \$222,809 in duty paid, and about \$915,000 in value, or nearly 1700 per cent. in value and 1200 per cent. duty—a tremendous increase in four years.

A report from Mexico says American capitalists are about to introduce machinery for decorticating the ramie and cotton stock fibers of that country, and that, in consequence, Mexican estates will be enhanced in value.

The Select Council in Philadelphia has voted in favor of elevated railroads in that city, which is supposed to insure the success of the measure.

In response of the recent letter of General Master Workman Powderly, requesting an expression from local assemblies of the Knights of Labor on the necessity for Congressional legislation in regard to trusts, Local Assembly 1233, of Baltimore, sent a letter to President Cleve-

land. This letter asks him to send a message to Congress demanding immediate legislation to abolish all institutions that gamble in food, and, as a further protection to the masses, that all "trusts" be abolished. "We ask this action of your Excellency," says the letter, "as law abiding citizens, that there may not be a repetition of what has occurred when the people felt the oppression of organized bodies of avaricious individuals, who too often have been fostered and favored by representatives abusing the confidence of the people by favoring a class, to the exclusion of the people at large."

The Builders' Exchange, of Pittsburgh, has appointed a committee for the purpose of selecting a site for the erection of an exchange, to cost in the vicinity of \$200,000. The building will be modeled after the plan of the Philadelphia, Boston and Chicago Exchanges. The basement will contain a trades school for the education of boys to be carpenters, painters, masons, bricklayers and all the arts appertaining to the building trades. The first floor will be a bank for the benefit of contractors, builders and architects. The second floor will be the exchange proper, where contractors and architects can meet and make agreements and where property owners can come and see about the erection of buildings. The third floor will be for the meetings of the exchange.

The magnates of the Southern Pacific and Central Pacific railroads are proposing to bridge the Carquinez Straits, an arm of the Suisun Bay, near San Francisco, and thus effect an entrance into the city without depending upon the big transport that now plies between Benicia and Port Costa, carrying trains from one side to the other. The exact location for the bridge has not yet been decided.

One of the jurors of the Brussels exhibition says American agricultural machines received "three diplomas of honor—the highest award—and one gold medal; in other words, there was awarded a diploma of honor for each exhibitor but one, and he really only deserved the gold medal. The other exhibitors fared equally well, for out of 73 *exposants* 54 got distinctions of greater or less degree. I think we have reason to congratulate ourselves."

The decision of the United States Court in Philadelphia adverse to the interests of silk manufacturers, by classifying ribbons among hat materials, and therefore subject only to a low rate of duty, excites severe comment. The manufacturers receive encouragement from the assurance from Washington that "it is the intention of the Department, as at present administered, to protect the revenues of the Government from loss by maintaining the classification which it has always insisted upon—namely, that these goods should pay duty at the rate of 50 per cent. ad valorem, and not at the low rate of 20 per cent. prescribed for hat materials, believing that when the question can again be brought before the Supreme Court the construction of the Department will be upheld."

The rapid growth of the Western Territories is shown by the annual reports just received in Washington. L. K. Church, Governor of Dakota, reports an increase gain in the population of the Territory during the year of 73,346 in a total population of 640,823. The quantity of land purchased for settlement was 2,500,000 acres. As to the discovery of tin in the Black Hills the Governor remarks that there is not to-day a producing tin mine nor a pound of Dakota tin in the markets. E. G. Ross, Governor of New Mexico, in his annual report says the questions of the settlement of land grant titles, water storage and irrigation are of the foremost importance to the development and future welfare of the

Territory. He says that of the 79,000,000 acres, the area of the Territory, 60,000,000 may be classed as tillable with proper irrigation. The facilities of the Territory for storing water are unsurpassed. The present system of independent ditching must be abandoned and the Territorial government must assume jurisdiction of the water supply and its distribution. The population of the Territory has increased during the year about 10,000. The aggregate value of the taxable property in the Territory is given as \$43,151,920. Of this amount \$15,370,960 is in livestock, \$7,466,869 in lands and \$8,858,350 in houses and improvements. Edward A. Stevenson, Governor of Idaho, estimates the population of that Territory at about 100,000. The value of taxable property is given at \$21,288,892, which, his report says, is less than one-half of its actual value in cash. About 460,000 acres of public land have been entered during the year. The agricultural productions for the year comprise 2,986,000 bushels of wheat and estates are valued at \$2,800,000. A report from the United States Assay Office, at Boise City, shows the gold, silver and lead production of the Territory for the year to be \$8,905,136, of which the gold was \$2,522,209, the silver \$3,422,657 and the lead \$2,960,270.

Every modern man-of-war is now provided with powerful electric searchlights. They are of the arc pattern, usually ranging from 8000 to 30,000 candle-power, so arranged with reflectors that their rays can be concentrated into a single beam and thrown in any desired direction. With one of these lights of only 8000 candle-power no difficulty is experienced in illuminating a target more than two miles distant, rendering firing at night as easy and accurate as by day.

A "corner" in the diamond market is spoken of as possible if the four diamond fields in Africa could be worked as one concern. It is even declared that a combination will be necessary, on account of the glutted state of the market, as present values very nearly touch the cost of production. It is even possible, we are told, that the costly gem may be found in many fresh places and become so common that it will not pay to mine, unless some fresh use should be found for it similar to that for boring purposes—some practical use, in fact, that will consume a great many stones and keep up the price.

The explosion of the oil-tank steamer Ville de Calais, employed in the oil trade between Philadelphia and Calais, excites much interest in shipping circles, particularly among agents and captains identified with sailing vessels, who argue that further explosions will put a decided check upon the building of steamers to compete with them. Respecting the cause of the explosion, one of the parties interested says: "The tanks must have been full of gas, left after the 15,000 barrels of petroleum which she carried had been pumped out. And then there must have been carelessness in examining the tanks. The first thing done after emptying the tanks is to fill them with water. The petroleum still remaining rises on top, and, when the tanks overflow, runs out. It is then that the tanks are examined, and in doing this the same safety lamps are used that are used in mines. Even after the tanks are empty, if a careless sailor, after lighting his pipe, threw the match down the hatch, just such an explosion as rent the Ville de Calais asunder might ensue."

The Treasury Department has decided that a vessel cannot be legally regarded as having arrived at New York upon a given date upon evidence that she had passed Sandy Hook or Quarantine on the day in question. Adopting the opinion of the Attorney-General upon this subject, the

port of New York only includes so much of the water adjacent to the city as is usually occupied by vessels discharging or receiving their cargoes or lying at anchor and waiting for that purpose. This definition necessarily excludes the waters adjacent to Sandy Hook from the limits of the port.

Chauncey M. Depew professes to believe that the prospects for railroad building are not good. The compulsory schedule made by the Iowa Commission "will not allow the railroads to make a penny." Besides, the proposition to reduce the tariff on steel rails, he says, causes railroad constructionists to delay work, in the expectation of buying materials cheaper than now. Even cheaper iron, in his view, would not accelerate railroad building, because railroads are useless unless there is business for them.

Iron bridges are being removed on the Pennsylvania Railroad, on account of their being too light for the heavy locomotives now employed and because stone bridges are considered more durable and more substantial.

R. M. Hunt, of New York, was re-elected president of the American Institute of Architects.

The preliminary statements of exports from the United States during September show that our wheat exports for the last nine months are less than half as great as for the corresponding months of 1887; our flour exports for 1888 fall little behind those of 1887, however, and largely exceed those of 1886. Our corn exports for the nine months fall behind those of 1887 by more than 6,000,000 bushels; but for the last three months they have exceeded in aggregate the corn exports of the same three months of 1887 by nearly 4,000,000 bushels. The comparisons of values of three items of breadstuffs exports for September are as follows:

	1888.	1887.
Wheat.....	\$5,318,835	\$4,701,860
Flour.....	4,405,652	5,351,812
Corn.....	1,824,228	926,628

The quantities compare as follows:

	1888.	1887.
Wheat, bushels.....	5,801,321	5,318,830
Flour, barrels.....	939,564	1,172,347
Corn, bushels.....	3,455,970	1,873,721

Last year the preliminary export statements for September were increased by \$18,200,000 by the final and complete returns. If the same increase is to be relied upon this year, the aggregate September reports will be shown to have been \$50,400,000. The imports for September, 1887, were \$56,009,735.

The exports from San Francisco to Australia for the past three months exceeded in value \$500,000, and the year promises to be the best in that trade California has ever had. The exports as above consist principally of lumber, doors, canned goods, salmon, broom corn and machinery.

The Venezuelan Government has entered into a contract for the introduction of French immigrants, apparently with the object of checking British encroachments.

The process of "electric sugar refining" is as great a mystery as that of the Keely motor. As long as it is conducted in "secret rooms" no outsider can form an intelligent opinion on the failure or success of its extraordinary claims.

The Lighthouse Board will ask Congress to prohibit the use of lights which are dangerous to navigation, the special reference being to those on the Brooklyn Bridge.

The Russian Government has under consideration a scheme designed to extend the oil trade in the Baku region, near the Caspian Sea. At present the oil has

to be conveyed either by tank cars over the railway from Baku to Batoum and then transhipped, or by tank steamers through the Caspian and up the Volga, from a point on the latter river being conveyed to its destination by railway. The plan now contemplated is to connect the rivers Don and Dnieper by means of a canal, deepening at the same time the bed of the Volga. This would permit the tank steamers to pass all the way by water from the Caspian into the Black Sea, and thence, of course, to all parts of Europe, while by means of the rivers the interior of the Empire could also be reached. It is said there are no engineering difficulties in the way.

The Copper River country in Alaska has been carefully explored during the past season by parties who have just returned, and report the discovery of an abundance of good coal. At Four Rivers, according to the *Juneau Mining Record*, of September 20, "there are immense quantities of coal in this section exposed to view. The creeks in many places run in beds of solid coal, and in some places it is hard to find good anchorage on account of the bottom of the bay being nothing but coal."

R. J. McConnel, of the Canadian Geological Survey, has just returned from the Yukon River. The region, he says, is a vast gold and silver bed. Gold can be seen with the naked eye in ledges along the banks of the stream. On the Alaskan side they have erected works where 190 heads of stamps are in operation. The gold yields \$30 to the ton.

Extensive new iron works are contemplated at Cairo, Ill., and Paducah, Ky. A Pittsburgh paper says Capt. S. S. Brown, of that city, has purchased a large tract at Cairo, with this object. One of the parties interested said: "Cairo is one of the best distributing centers on the continent to-day. Aside from the navigable waterways, there are the great railroad facilities. The city is 286 miles from Chicago, and therefore convenient to the great iron ore mines of Lake Superior. It is 200 miles from St. Louis, and a central point between the prosperous East and the growing West. Aside from the Lake Superior ores, there are the Tennessee ores, slightly inferior in quality, but still good, and at High Tower, near the city, as fine limestone as can be found in the United States is to be had in large quantities. I understand that one of the most extensive iron manufacturing firms in St. Louis has decided to locate large works at Paducah, Ky."

The test suits of John W. S. Earnshaw and Naylor & Company against Collector Cadwalader, of Philadelphia, to recover alleged excess of duty on importations of iron ore, resulted in a verdict for the defendant in the United States Circuit Court. If the complainants had gained their point a precedent would have been established, under which the Government would have been required to refund large sums of money as excess of import duties to various importers of iron ore. The question in dispute was whether, under the Tariff act of 1883, which assesses a duty of 75 cents per ton on iron ore, the Collector could not be compelled to make an allowance of about 10 per cent. for the moisture contained in the article. The verdict practically determines that no allowance for moisture should be made. The suits attracted widespread attention, and arrayed the producers of the domestic article against the importers of African and Spanish iron ore.

The Brotherhood of Locomotive Engineers, in session in Richmond, Va., on Saturday re-elected the following officers: Third Grand Engineer, J. R. Spragge, of

Toronto, Canada; First Grand Assistant-Engineer, H. C. Hayes, of Cleveland, and Second Grand Assistant-Engineer, A. M. Cavener, of San Francisco. Executive Committee, Edward Kent, of Jersey City; R. M. Clark, Denver, Col.; Edward Tinsley, Hamilton, Ont.; Wm. Johnson, Rock Island, Ill., and J. F. Regard, Atlanta, Ga. A resolution was adopted indorsing the action of Chief Arthur in all matters pertaining to the Brotherhood since the last session. This virtually sustains Chief Arthur's action in the "Q" strike. The next convention will be held in Denver, Col.

Railroad officials have inspected the terminals on Staten Island in anticipation of the opening of Arthur Kills bridge, which is now nearly completed.

Another big telescope, dwarfing the instrument in Lick Observatory, is proposed by the University of Southern California. Perhaps in co-operation with Harvard University, a glass will be made 42 inches in diameter, as compared with 34 inches, the size of the Lick glass, and the effect will be to bring the moon within 60 miles of the earth, as it would appear if viewed by the naked eye. Mr. Clark estimates the cost of the glass and the mounting at \$100,000.

The assassination of two paymasters near Wilkesbarre, Pa., in order to obtain the money they carried, raises the question whether it may not be necessary to adopt some other system of payment than that heretofore followed in the mining regions for the payment of miners and railroad laborers. Many thousands of dollars are sent from the banks weekly to coal-mining centers, and from there distributed by paymasters to various little settlements in the mountains. The men charged with this duty often have to drive for miles over wild and sparsely settled regions; their mission is well known, as also the time of their coming and the fact that they have large sums with them in small notes, that cannot readily be traced or identified.

The Manhattan Elevated Railroad Company have paid into the City Treasury \$275,000 taxes for 1887. The road sought to avoid the payment of taxes on \$19,000,000 of stock. The matter went into the courts, and the Corporation Counsel declared that the untaxable bond scheme was only a ruse, and carried the case into the Supreme Court, General Term, which promptly dissolved the injunction which the road had obtained.

It is affirmed that the electrical subway in this city is seriously injured by leaks in the pipes of the Steam Heating Company. The fault in the pipes, President Andrews says, is due to the use of wooden instead of cast-iron wedges. Since its completion the company, he said, had spent over \$250,000 for repairs, and he thought further leaks were not likely to occur.

Notwithstanding her mishaps, the new steamship City of New York promises to attain extraordinary speed. As compared with the third trips of the other swift ocean steamships, the City of New York's third trip stands at the head. Following is a record of the time made by the Etruria and Umbria in the first three trips, as compared with those of the City of New York:

	Etruria.		Umbria.		City of New York.	
	D. H. M.	D. H. M.	D. H. M.	D. H. M.	D. H. M.	D. H. M.
First.....	7 18 05	7 16 25	7 11 30			
Second.....	7 2 08	8 14 12	8 12 58			
Third.....	6 22 38	6 23 25	6 15 37			

Refugees from Jacksonville were prohibited by a resolution of the Board of Health, passed 19th inst., from returning to the city until officially informed that it is no longer hazardous to do so. They promise never again to "take to the woods" to escape yellow fever.

MANUFACTURING

Iron and Steel.

M. V. Smith, of Pittsburgh, has closed a contract with the Virginia Iron and Nail Works Company, of Lynchburg, Va., for the erection of a regenerative gas furnace, with a 22-foot working hearth. The furnace will have a capacity for melting 45 tons of steel every 24 hours.

McClure & Schuler, the well-known engineers and contractors, of Pittsburgh, have received the contract for the erection of the new blast furnace of the Carrie Furnace Company, to be erected at Rankin Station, on the Baltimore and Ohio Railroad. The furnace will be erected adjacent to the present blast furnace of the Carrie Furnace Company, and will have an 18-foot bosh, and will be 80 feet in height. It will be equipped with four Massicks & Crook's hot-blast stoves, 19 feet 6 inches by 70 feet. Riter & Conley, of Pittsburgh, have received the contract for the ironwork for these stoves, while McClure & Schuler will erect everything else pertaining to the furnace. It will have a capacity of about 200 tons per day. Work will be commenced in a few days, and it is expected that the furnace will be ready for operation not later than April 1 next. McClure & Schuler have also closed a contract with the Thomas Furnace Company, of Niles, Ohio, for the equipment of the Thomas Furnace with three Massicks & Crook's hot-blast stoves, work on which will be commenced in a few days.

The Union Steel Company, of Chicago, shut down their steel works and rail mill on the 16th inst. for lack of orders. They will probably remain idle until the close of the year, unless some of their customers should desire a round lot of rails on quick delivery, which would make it worth their while to light up. These works have made a very satisfactory run since they were started up in the spring, their output of steel and rails having been very large for the time they were in operation. The blast furnaces owned by the company will be kept at work making pig iron, which will be piled up to await the resumption of the steel works.

The Chicago Forge and Bolt Company were the successful bidders for the contract for the superstructure of the Western avenue viaduct, Chicago, which was let last week. Their bid was \$17,800.

The Standard Iron Company of Bridgeport, Ohio, have just completed an addition to their plant, which in part consists of a three-high train for rolling steel and iron sheets and plates, from No. 14 to $\frac{1}{4}$ -inch in thickness, and not exceeding 50 inches in width. This train is equipped with all modern appliances, insuring economical handling of product and satisfactory execution of orders. Fearing delays in getting this part of their extension into operation, the company have not heretofore offered their product, and are now consequently able to quote prices for prompt shipment.

The National Tubular Axle Company, of McKeesport, Pa., have commenced the erection of a large stockhouse, the foundation being already completed. When this addition is completed the works will be enabled to stock up in slack times, and be prepared for supplying larger orders on shorter notice.

From a recent issue of the Youngstown (Ohio) *Herald* we take the following: "Andrews Bros. bought the site of the Niles Company's mill this week for \$3500. It consists of about 17 acres, was formerly owned by the Harris Blackford Company, and then the Niles Iron Company. The old mill was moved to Hazelton, and it is

now predicted that Andrews Bros. will put up a new bar and sheet mill. It is a surprise to many that the plant was sold, as the Niles Iron Company were not at all embarrassed and the property was worth much more money than it was sold for."

It is reported on good authority that the Millvale Rolling Mill of Graff, Bennett & Co., at Pittsburgh, which has been idle since the failure of that firm some months ago, will be started up about November 1 next by the same syndicate of creditors that is now operating the Clinton Rolling Mill and Blast Furnace. It is probable that only the puddling department of the mill will be put in operation at the start, to be followed later on by the resumption of the entire plant.

The Mahoning Gas Fuel Company has withdrawn its supply of gas from the mills of Brown, Bonnell & Co., at Youngstown, Ohio, on account of the refusal of the firm to change their furnaces so as to adapt them especially to the use of gas. When gas was introduced in the mill as a fuel the furnaces, formerly using coal, were not changed, and the gas company claim that enormous quantities of gas have been thereby wasted. It is said that more gas is wasted in the Mahoning Valley than in any other industrial section in the country in which gas is used.

The Fort Pitt Foundry, of D. W. C. Carroll & Co., Limited, at Pittsburgh, who made an assignment some months ago, will be auctioned off at an assignee's sale, on Tuesday, the 30th inst., to satisfy a mortgage for \$34,000, placed October 1, 1887, with interest in arrears. A tract of land in Braddock Township will also be sold at auction. On it are mortgages, one for \$6000, placed November 8, 1887, and another for \$5385.50, placed November 22, 1887, both with the accruing interest. W. R. Errett is the assignee, and James W. Drape the auctioneer.

The well-known firm of W. D. Wood & Co., Limited, of Pittsburgh, whose plant is located at McKeesport, Pa., have given notice of an application to the Governor for a charter for a corporation to be known as the W. Dewees Wood Company. The capitalization of the new company will be \$1,000,000, and the charter is to give the firm more privileges than under the present manner of conducting their business. At present no enlargement of the works is contemplated.

Carnegie, Phipps & Co., Limited, of the Homestead Steel Works, at Homestead, Pa., are engaged on rolling some extremely heavy armor plate for the Ordnance Department. These plates are 141 inches long, 112 inches wide, 2 inches thick, and weigh over 10,000 pounds each, with 80,000 pounds tensile strength.

The Woodstock Iron Company are excavating for the erection of large ore roasters, at their two new coke furnaces at Anniston, Ala.

P. L. Kimberley & Co., Limited, proprietors of the Atlantic Iron Works, at Sharon, Pa., and the Greenville Rolling Mills, at Greenville, Pa., have opened an office in St. Louis, Mo., with Louis McGilvray in charge. The firm's increasing trade in that section of the United States necessitated the new branch.

In the Pittsburgh papers, recently, was published a statement that Laughlin & Co., proprietors of the Eliza furnaces, in that city, had commenced the erection of a new blast furnace. We find, upon investigation, that the rumor is not well founded. It probably originated from the fact that one of the old furnaces will be blown out in a short time, and will then be torn down and rebuilt to a 200-ton furnace, which is about double the present output. The two old furnaces now

in blast have been producing on the present lining since 1882 without interruption, each furnace casting about 100 tons per day.

In a few days work will be commenced on a large addition to the works of J. P. Witherow, the well-known engineer and contractor, of Pittsburgh, which are located at New Castle, Pa. The addition, which is to be of brick and stone, will be 91 x 136 feet, with a tower 81 feet high, in which there will be offices on each of the three floors. The addition will give the machine shop almost double its present capacity.

Claire Furnace, owned and operated by the Claire Furnace Company, Limited, at Sharpsville, Pa., have been doing some good work recently. For the week ending on the 14th inst. the product was 896 tons of Bessemer iron. The best day's work during the week was 147 tons. This is the largest amount of iron ever made by any blast furnace in Sharpsville in 24 hours.

The plant of the Union Steel Nail Company, located at Omaha, Neb., is about to be removed to St. Joseph, Mo. Upon its removal it will be greatly enlarged and modernized, the present plant being but a nucleus. The style of the corporation, in order to transact business under the State laws of Missouri, will be the Union Steel and Iron Company. The following are officers of the new company: Wm. Haven, president; George T. Walker, vice-president, and W. N. McCandlish, secretary and treasurer.

The report that the Bellaire Nail Works, of Bellaire, Ohio, was making steel from metal direct from the furnace is without foundation. What gave rise to the report was the fact that the company recently made one heat from metal direct from the blast furnace. As to what may be done in this direction in the future, James Wilson, president of the company, expresses his views as follows: "Whatever we may do in using metal direct from the furnace hereafter, we are making no arrangements at present in that direction. We are very fully aware of the difficulties to be met and overcome in making the grade of steel we aim to make by the direct process, but think it possible that blast furnace practice may be ultimately so uniform as to product that the principal difficulty in using the direct process will be overcome."

The Muncie Nail Company have been organized and chartered at Muncie, Ind., with a capital stock of \$200,000, to succeed the Greencastle Iron and Nail Company, of Greencastle, Ind., and under the same management, with the following-named directors: J. F. Darnell, F. P. Nelson, Wm. H. Durham, Jas. V. Durham, and R. B. F. Pierce. The product for the present will be steel and iron nails and muck bar. The buildings for the Muncie Nail Company are completed and the work of moving the plant from Greencastle to Muncie is progressing rapidly. When fully equipped the new plant at Muncie, in point of convenience and arrangement, will be equal to the best nail mill in the country. Natural gas will afford all the fuel and light, the gas being located on the grounds of the company and controlled by them.

The Mayville furnace, at Mayville, Wis., was blown in on the 13th by H. S. Fleming, who reports that the blast was put on on the 14th, and on the 15th a cast of No. 3 iron was made. On the 17th the furnace was making two-thirds of its capacity.

The Mason ingot manipulator, which was described in *The Iron Age* of recent date, continues to do good work in the

steel plant of the Bellaire Nail Works, at Bellaire, Ohio, where it has been in successful operation for some time. For the month of September just closed the production of the steel plant was the largest in its history. The largest output in one day previous to the introduction of the manipulator was 207 tons, while the largest daily production since the introduction of the same has been 222 tons. The largest weekly run without the manipulator was 1927 tons, but since its adoption the output in one week in September reached 2003 tons. This work was performed with three men less to the turn than were employed before the manipulator was used.

Hon. John H. Bailey, assignee of the firm of Graff, Bennett & Co., has filed a petition in Common Pleas Court No. 2, at Pittsburgh, asking for permission to sell the remainder of the firm's assets to a syndicate of the firm's creditors, whose claims aggregate \$450,000. The property of the firm still in the hands of the assignee consists of several small pieces of real estate scattered throughout the country, a large number of uncollected accounts and interests in other firms, some of which are uncertain and indefinite, and others of which are in litigation. The syndicate, which is represented by James M. Bailey, James Pickands and James W. Friend, offer to pay \$50,000 for these assets, this sum to be deducted from the dividends due the creditors who form the syndicate. The assignee believes that the offer is a reasonable one, and, as it would wind up the affairs of Graff, Bennett & Co. in short order, recommends that it be accepted. A hearing on the petition will be held on November 3 next.

Machinery.

The Cleveland City Forge and Iron Company completed last week the last piece of the ponderous machinery built by them for the Puritan. It is the connecting-rod, weighing, when finished, about 21 tons. It is 40 feet long, and finishes 18 feet 6 inches diameter in the middle. Constant improvements are being made at these works. For the turnbuckle department a new brick and iron building has been erected 330 feet long by 65 feet wide. There will be four large forging machines at work in this shop. A new one is being erected that will exert a force of 6000 pounds at the point of impact. The capacity of the mill will be about 2000 turnbuckles a day. In this department is manufactured the Chapman jack, a machine which is meeting with great favor and large sales. Next year the Forge Company propose to rebuild their entire main shop with brick and iron, a very wise conclusion, as their plant is entirely too valuable to run the risk of damage by the burning of the wooden sheds now inclosing it.—*Trade Review*.

The Lewis Foundry and Machine Company, Limited, of Pittsburgh, have received an order from the American Wire Nail Company, of Covington, Ky., for the erection of a Garrett rod mill on the Anderson, Ind., gas belt. The works will cost in the neighborhood of \$200,000, and when completed will give employment to over 200 men.

The Westinghouse Electric Company announce their lease of the Consolidated Electric Light Company, of New York City, and the Sawyer-Man Electric Company, also of New York City. The Westinghouse Electric Company have had heretofore a working arrangement with these companies, by which they were able to avail themselves of the protection of the Sawyer-Man lamp patents, and to profit by the peculiarities in the manufacture of lamps covered by these patents, which had originally placed the Sawyer-Man lamp in the fore-front of the business for life, ef-

iciency and freedom from blackening, and the adoption of which processes, in connection with what are known as the Lodyguine processes, has so greatly improved the lamps now manufactured by the Westinghouse Electric Company. This lease gives the Westinghouse Electric Company entire control of these two companies. The two factories which the Westinghouse Electric Company now control under this lease—namely, the one at their works in Pittsburgh and the one on West Twenty-third street, New York City—have a joint capacity at present of 10,000 lamps per day.

Lodge, Davis & Co., Cincinnati, Ohio, report sales of from five to thirty duplicates of the various machine tools exhibited at the Centennial Exposition since the opening. Their new manufacturing plant is now complete and in full operation. The new plant is one of the largest machine tool manufacturing establishments located in the West, occupying an entire square, a portion of the building being three stories in height, while the balance is two stories.

The St. Joseph Pump Company, St. Joseph, Mo., are introducing with gratifying success to the trade the Perfection Water Elevator and Purifier, for which the company claim many points of superiority over similar constructions, chief of which is the flat-link connection used in their elevators. The cup being permanently fastened to the wire link obviates the necessity of removing it in order to lengthen or shorten the chain, as is done with all other makes. The company enjoy ample facilities for the production of their goods, consisting of a new factory building three stories high, 50x120, with a two-story addition, 75 x 50, warehouse building, 50 x 100, three stories; galvanizing and varnishing building, dry-house, &c., located just south of the city limits.

The Auburn Mfg. Company, of Auburn, N. Y., have just added to their extensive works a steam plant, to be used as auxiliary power in seasons of low water in the Owasco River. The engines consist of one pair right and left compound condensing single crank automatic cut-off of 150 horse-power each, and were manufactured by Messrs. McIntosh, Seymour & Co.

Hardware.

The nail and wire mills of the Hartman Steel Company, Limited, at Beaver Falls, Pa., are closed down at present, on account of an insufficient supply of natural gas. The Bridgewater Gas Company have the contract to supply the works with gas, but for some time past the supply of gas has not been sufficient to operate the works. This shortage will be remedied as soon as a line can be laid from the Bakerstown field, work on which is now being actively pushed.

The New Castle Wire Nail Company, of New Castle, Pa., are increasing their capacity considerably by the erection of some new machinery.

The Covert Mfg. Co., West Troy, N. Y., report an unusual demand for their full lines of specialties, obliging them to run their works to their full capacity, the month of September having been especially active. They also allude to the fact that many of the leading jobbers are now preparing their catalogues for publication, and state that the demand thus made for electrotypes illustrating the Covert goods has been greater this season than ever before.

The Bellaire Stamping Company, of Bellaire, Ohio, under date of the 9th inst., write us as follows: "Since the beginning of the current year this company has more than doubled its manufacturing capacity. The first step toward making the increase

was the purchase of the plant of the Buckeye Lantern Company, of this city. This included their letters patent, stock of lanterns, machinery, and factory building. The latter is a large, substantial brick building, built by the State for a tobacco warehouse and now used by us partly for manufacturing purposes and partly as a warehouse. We have just completed a new three-story brick building in connection with our main building, and are now changing a two-story frame building 40 x 100 feet into a corrugated iron building. The entire plant, then, consists of two brick and one iron factory buildings and one brick warehouse, all of which are considered fire-proof. The buildings are heated by the Sturtevant hot-air system and are fitted up with the most modern appliances."

Miscellaneous.

The American Leather Link Belt Company report recent sales of their leather link belting to the following firms: J. H. Horne & Sons Company, Lawrence, Mass.; Angle Lumber Company, Houston, Tex.; P. Lorillard & Co., Jersey City, N. J. Economic Gas Engine Company, 34 Dey street, New York; Remington Paper Company, Watertown, N. Y.; Heidenheimer Bros., Galveston, Tex.; Travers Bros., 556 West Fifty-second Street, New York; Philadelphia Rubber Works, Philadelphia, Pa.

The Illinois Alloy Company, 41 and 42 Portland Block, Chicago, have issued a circular showing the result of a comparative test of their best brand of bearing metal and that of four other makers by the Ohio State University on the 11th inst. The journal was kept well lubricated and the total pressure was 2000 pounds. With sperm oil the average friction shown by their metal was 0.0582, against 0.075, the lowest of the other four; the minimum friction was 0.034, against 0.0485, the lowest of the other four. With mineral oil the average friction was 0.0436, against 0.0686, the lowest of the other four; the minimum friction was 0.0305, against 0.0465, the lowest of the other four. With lard oil the average friction was 0.0517, against 0.0554, the next lowest; the minimum friction was 0.0375, against 0.0455, the next lowest.

A charter has been issued to the Pittsburgh Iron Company, of Pittsburgh, capital \$10,000. The directors are Charles Hood, Joseph Vogel, Sr., E. L. Clark and John Bunnette, of Pittsburgh, and Joseph Robbins, Westmoreland County.

The sheet and rod mills of the Tamarack-Osceola Copper Mfg. Company are being driven with orders, as there is a large amount of work to be turned out and shipped before the season of navigation closes; 25,000 pounds of bars were turned out last Monday. A 15-lamp dynamo is being placed in the mill, to be driven by the 12 x 12 blower engine. The new wire mill is covered in, and the foundation for the engine, which is to be a compound Wheelock, is being put in. Work on the smelting buildings is being pushed rapidly forward, one of the buildings being almost completed.

Kingman & Co., Peoria, Ill., announce under date October 4 that they were awarded the first premium for the largest and finest display of farming machinery at the St. Louis Fair, October 2, 1888, and allude to the extent of the exposition of agricultural machinery and products as giving value to the compliment bestowed upon them. They also state that they are busily at work rebuilding their Peoria warehouse, which was burned August 14, and state that they will add another story, giving them seven floors. They are also building the Peoria Cordage Company's factory, and expect both to be under a roof by December 1.

The Iron Age

New York, Thursday, October 25, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Percentage Fiend.

In our recent articles dealing in a general way with the question of protection, we have sought not so much to follow the well-worn lines of argument on the subject as to point out features of it which have been largely overlooked on both sides. It is in that spirit that we now desire to call attention to the performances in this field of one of the pests of logic, the percentage fiend. Nothing is more fashionable among amateur statisticians than the expression of all results in percentages. It gives such an air of scientific generalization and irresistible conclusion, and so few people will take the trouble to analyze the process by which the imposing result is reached, that the temptation to adorn the flimsiest structures of statistical inference with this fine architectural cornice is well-nigh irresistible to the Buddensieks of sociology, politics and finance.

When the greenback dollar was worth but fifty cents in gold, the percentage fiend declared that the depreciation amounted to 200 per cent. And we notice something of the same quality in many of the percentage calculations now current on the tariff question. Apart from such crass arithmetical blunders, however, there are more serious and subtle errors attending the use of percentages in talking about the tariff. One of these has been often exposed, but continues to be asserted by one party and not infrequently permitted to pass without denial by the other. We refer to the current statement that the Mills bill reduces the average duty from about 49 per cent. to about 42, or only about 7 per cent., and is, therefore, nothing so very terrible after all. We have heard these figures slightly varied, but this seems to be the "average" statement. It is incorrect and misleading from every point of view. In estimating the average reduction it excludes all the articles put on the free list; or, to speak with the tongue of the fiend, it arrives at the average percentage by omitting all items of 100 per cent. Moreover, a reduction from 40 to 42 per cent. is a reduction of over 14 per cent. And, finally, the whole method of estimating the "average" duty in this way is utterly worthless as a measure of the amount of protection accorded by the tariff—so utterly worthless that the man who discusses the tariff in terms of percentage only goes far to demonstrate his entire ignorance of the alphabet of the subject.

The percentage of a single duty is not the measure of its value to the manufacturer, or even of its alleged burden upon the consumer. And the average percentage of duties throughout the whole list of dutiable goods means still less. There are two ways of calculating it, one of which

is as meaningless as the other. The duties themselves may be averaged, giving each item in the law an equal value, without reference to the quantities imported; or the total valuation of imports may be compared with the total Custom-House receipts. It is evident that by either method a thousand different tariffs might yield the same result, and that by the second method (which we presume to be that of the "average" percentage fiend of to-day) the same tariff will yield a different result every year. The final *non sequitur* is reached when, for the purpose of such a calculation, specific duties are transferred into percentages, so that as protection and progress cheapen goods year by year the "extortions" of the tariff are made to appear bigger and bigger. Thus American railroads were but slightly burdened when steel rails sold at \$165 per ton, and are crushed to earth with rails at \$30 or less!

There is another exercise in which the percentage fiend delights. "In such-and-such a year," he cries, "such-and-such a trade thought so-and-so-many per cent. a sufficient protection. We have given them that much in the Mills bill, and they pretend it will ruin them. What impudent and self-evident lying!" We do not expect to reclaim the fiend. In fact, we have called him a fiend to signify that he is beyond reclamation. But innocent people, puzzled if not tempted by his demoniac suggestions, may profit by the following reflections: Assuming that the American manufacturer of any article needs and ought to have any protection at all, and is not necessarily a thief and robber if he asks for it, what he needs is not so much a percentage as a certain definite sum to cover his extra costs. His protection consists of this sum, plus the freights of his foreign competitors. An ad valorem duty is not as good, either for the manufacturer or for the public, as a specific one. The duty which helps to protect him does not protect simply in the proportion of its percentage. The cheapening of his product by competition and scientific improvements does not necessarily reduce his need of protection in the same proportion. And the reduction of ocean freights may deprive him of so great a part of that protection as to render his request for a higher percentage of duty (or even for an absolutely higher specific duty) entirely reasonable. In other words, the fiend's proposition is not self-evident at all.

The subject of the reduction of cost in international transportation is one that has not been sufficiently considered by tariff disputants. And it is part of a larger subject—namely, the total revolution in the business methods of the civilized world during the last two decades, in accordance with which political economy has got to be reconstructed also. It will still be open, to any one who chooses to advocate entire free trade; but it must not be supposed that even free trade will operate as it would have done 20 years ago, when the protective barriers of nature—distance and the sea—still exerted a formidable influence. This tariff of nature has been almost removed by the progress of science, and, in the face of this reduction of duty, prating about percentages is both superficial and superfluous.

Finally, if a certain duty, however expressed, is necessary to maintain the existence of a given industry, there is no sense in the proposition that its reduction by a given percentage, whether 7 or 14 or any other amount per cent., is moderate and liberal treatment and not "free trade." Less than enough is practically nothing. We do not now propose to discuss the question whether the reduction of duty proposed in the Mills bill would, in fact, destroy any American industry. What we desire to emphasize is the fact that the proposal is made in ignorance of its effect; that no adequate inquiry into the matter preceded the framing of the bill, and that its reported authors and avowed advocates before the public fully betray and confess this fact when they adopt as their only argument the lingo of the percentage fiend.

Hamburg in the German Customs Union.

The merchants of the hitherto free Hanseatic cities, Hamburg and Bremen, are the most enterprising, and, financially, most powerful, in Germany. They are, at the same time, the largest shipowners; their trade extends to the remotest corners of the habitable globe, and, with the United States—New York in particular—they have at all times transacted an enormous amount of business. Hardly a day passes but one of their large steamers enters or leaves our harbor. A radical change in their commercial and industrial condition is, consequently, a matter of no small interest to ourselves. They were large free ports, and prided themselves upon being the last remnants of the famous Hanse League of commercial cities, founded in the year 1239.

Steam, the telegraph, and, finally, the restoration of the German Empire, have, however, wrought such changes that both ports enter the Customs Union without regret—nay, with a confident hope of bettering themselves. The fact is that large free ports are at a discount, since there is no longer any necessity for the accumulation in bond of large amounts of staple products at leading ports, steam, the telegraph and the Suez Canal facilitating the rapid procurement of such goods, and, furthermore, enabling large inland cities to do an extensive direct trade with Transatlantic countries, the goods passing through the ports merely in transit. Trieste was the first free port declaring its readiness to abandon what was till then deemed an enviable privilege. At the time of the restoration of the German empire, in 1871, two of the four free cities in Germany had already lost their freedom, one forcibly—Frankfort-on-the-Main in 1866—and Lubeck voluntarily soon after. Upon the creation of the new empire Hamburg had stipulated that her old rights of a free port should be maintained, and a guarantee to that effect had been given in Article 34 of the constitution of the empire. But it had been found that from the time Frankfort became an integral part of Prussia its prosperity increased more than ever. This the Hamburg people knew, and gradually a majority of them decided to enter the Customs Union, especially since it was feared that if they hesitated all the German commerce would pass via Altona and

Gluckstadt. In 1881 the city, therefore, petitioned for admission into the Customs Union, and a convention was drawn up fixing the conditions of such admission. The right of Hamburg as a free port is not entirely surrendered by this convention, but the free entry is limited to a quarter on the left bank of the Elbe, in which quarter, however, nobody is permitted to reside, nor are there to be any bridges connecting it with other parts of the town. In order to simplify the customs regulations a canal had to be dug along the left side of the river, toward the expenses of which the Federal government contributed 40,000,000 marks. Besides, Hamburg's demand was granted that ships should be permitted as heretofore to pass from the sea into the free port without customs inspection, and that the supervision between the free-port part of the town and the Customs-Union territory should be intrusted to Hamburg officials.

Hamburg will gain more advantage from the annually growing seaport trade of Germany than it had from its own manufacturers and maritime trade in foreign products. Besides, even this trade will increase and not diminish, and with the powerful assistance of the German Empire it will have nothing to fear from other ports, like Antwerp, for instance, which otherwise might have become an extremely dangerous competitor. The measure of incorporation was passed by the German Parliament in 1882, and became operative on the 17th inst.

Old Hamburg has ceased to exist, and a new state of things has been established and inaugurated by the abolishment of the separate excise duties of the town, which have a very interesting history of their own, and which still found many defenders during the last few years; but the citizens of Hamburg, when they once had decided to enter the Customs Union, wanted to abolish even the last remnants of their mediæval commercial legislation and make a clean sweep. The little houses on the turnstiles have been demolished, and magnificent edifices of the Federal Customs Administration have been erected where the free port district borders on the protective territory. On December 1, 1885, the population at Hamburg was 518,620; in 1886, its import of merchandise amounted to 2,080,700,000 marks, and of specie and bullion to 49,600,000; the merchandise received from the United States, direct, was 111,600,000 marks. Bremen will follow suit and be merged as soon as all the new custom-houses there shall have been finished, together with the new harbor works.

Cheap Passenger Tickets.

Some of our progressive merchants in different lines of trade have been discussing among themselves the feasibility of certain improvements in transportation, and during the early winter something may be done publicly toward asking the attention of railway managers. One of these things is an extension of the excursion or round-trip plan in tickets. It is well known that the old traditions of the Trunk lines were all against any reduction from the one rate of fare. The argument was that the buying of a round-trip half-fare ticket meant merely so much loss, since the regular full fare would other-

wise be paid, but this is clearly erroneous. As a matter of fact the cheap traveler and the first-class passenger can scarcely be classed together, and are not really competitive. One man wants luxurious vestibuled cars with all the modern appliances of speed, dining cars and the like, and is willing to pay for them. Another country merchant, obliged to look closely after his dollars, is tempted into a journey to his headquarters by a reduction of fare, even if limited to slower trains. The astute railroad manager accordingly arranges his fares and time-tables to secure both kinds of travelers. This is the highest wisdom, for, granted that the trains must run, any plan which will fill them full instead of half-full will add to the earnings and little or nothing to the expense. It is important that the cheap tickets should not be used by the well-to-do first-class passengers, and many are the devices to secure this end. The English plan is by different coaches on each train at different rates of fare, but this is cumbersome, since it requires the hauling of many more cars than is necessary to accommodate the people. To confine cheaper travel to special trains is tried in the United States by means of "limited" trains, or, in the case of workmen's trains, at special hours.

In freight matters the American railways lead the world in cheapness, and this has been accompanied by such an increase in tonnage that net revenue is not diminished. This has been brought about in a measure by the principle of fitting the rate to the necessities of the shipment, so that traffic which could only be moved at lowest rates was carried, and with it other shipments at double the charges, each according to its commercial ability to pay the carrier. If it were possible to apply this same principle thoroughly to passenger travel we would solve the problem. If we could judge whether a journey were worth \$5, or \$20, or \$1, to a passenger, and could sell him a ticket accordingly, we could double the present number of trains at increased revenue for the railroads, and at the same time give all merchants a chance to come into town on frequent trips in search of purchases or novelties. It is in human nature to settle into ruts, and we all need the stimulus of other minds and of other sights than our usual ones to make us put forth our best exertions. A general storekeeper who rarely leaves his native village soon loses his ambition. So it is that the city manufacturer or jobber who wishes to see the reward of his thought and enterprise in larger sales must at the outset find customers who appreciate this effort, and this in turn demands a certain amount of culture which is not so often found in retailers who never leave home. Hence, it follows that the manufacturer or jobber has a direct interest in giving his support to any movement among his fellow tradesmen or among the railroad men to bring to his city such retail merchants as do not now travel, but who might do so under a reduced rate of fare.

It is but fair to concede to the railroads such restrictions upon cheap tickets as will generally restrain their sale to the class for which they are designed, and yet there is no doubt that less progress has been made in this direction than in any other department of railroading. We need a more thorough study of the passenger problem,

with more liberal views as to the effect and the necessity of half-fare round-trip tickets. If this could be secured all would be gainers—the railroads, in trains well filled; the city merchants, in more frequent visits from country customers, and their consequent more rapid sales of novelties and improved articles; the neighboring tradesmen, in opportunities for keeping a better run of things and for personal inspection of city stocks. Intercourse is the great means whereby we all advance in civilization equally, and cheap tickets for those who cannot buy dearer ones would greatly promote it. The merchants can suggest, but the practical steps must be taken by the railroads. If, as hinted, some public requests be made by merchants in different cities during the winter, asking that the matter be given closer attention by our railroad superintendents and passenger managers, then we may hope for a practical advance in this direction.

Settling a Strike.

An important chapter in strike literature has just been contributed in Chicago. The development of the trouble leading to the strike and the subsequent attitude of the contending parties in interest were of an unhappily common character; but the way in which the matter was finally settled was altogether unique and worthy of being taken into consideration in other localities. A demand for a rearrangement of working hours and an increase in wages had been made by the employees of an important street railway company, which was conceded by the managers as to the first point, but refused as to the second, whereupon all hands struck. For the purpose of embarrassing the management, a strike was also precipitated on another extensive street railway system in which they were interested, although the employees of that system had no grievance of their own. A third line, having no connection whatever with the first two, was also tied up, merely because it ran through part of their territory. Altogether a good two-thirds of the street railway service of Chicago was involved, to the great discomfort, inconvenience and even pecuniary loss of a large part of the city's population. This condition of affairs lasted for a week, an attempt being made in the meantime by the railway managers to secure new men to run their cars, which was opposed in every way by the old force of hands and their sympathizers, requiring the constant efforts of the entire police force of the city to prevent rioting and consequent damage to property, as well as loss of life.

During the continuance of the strike unceasing efforts were made by the city authorities and prominent citizens to bring the contending parties together and effect a basis of settlement, but their well-meant attempts at mediation were unsuccessful until the citizens generally held indignation meetings protesting against the stubborn attitude of the belligerents and insisting upon the adoption of a compromise. The daily press also took the same position, and a powerful expression of public opinion was thus evoked which had its influence. Committees were appointed by the striking men to meet the railway managers and Mayor Roche in consultation, and those who were striking in sym-

pathy were ordered back to their posts again to await the result of this supreme effort to settle the trouble. Professional labor agitators, who had made themselves conspicuous in directing the councils of the strikers, but were not railway employees in any capacity, were excluded from the deliberations.

Then came the critical point, when the most careful management was needed to bring the hostile parties upon a common ground of mutual concession and effective agreement. The conference was long and evoked much bitterness, but Mayor Roche steadily reminded both sides that, as the representative of the people, he was there to see the dispute finally settled, and that a compromise should be arranged. A beginning was made, but details were hotly disputed, new objections and difficulties arising as soon as old ones were disposed of, any one of which would probably have been a fatal bar to further progress toward a settlement if the chief magistrate of the city had not persistently appealed to the parties that they should not permit trivial matters to interpose and prevent an agreement. At length all questions at issue were adjusted and the strike was pronounced at an end. It would hardly be supposed that the result of negotiations carried on under such circumstances would be very satisfactory to either set of disputants. Both gave way further than they would have done without the pressure personally applied through the Mayor, but which they felt came from the citizens generally. The sores left may take some time to heal, and an occasional outcropping of bitterness may be manifested, but the condition of affairs is much better with a general resumption of business than would have been the case if the fight had continued several days longer and involved widespread interest. The loss in income to corporations, in earnings to workmen, in sales to business men, might have reached enormous amounts, to say nothing of the inconvenience entailed on all classes of citizens and the inevitable accompaniment of injury to persons and damage to property.

This has been averted by the decisive action of Mayor Roche. The position he took as a compulsory arbitrator is worthy of imitation under similar circumstances in these days of frequent strikes and labor troubles. The warrant for such action does not necessarily rest in statute law, but comes from a higher authority—the welfare of the community. The questions at issue between employers and employed may seem to them to be of immense importance, but the interests of the people at large are paramount. Mayor Roche did well in making them an active third party in the settlement of the Chicago controversy.

OBITUARY.

FRANK M. REYNOLDS.

Frank M. Reynolds, superintendent of the United Coal and Coke Company, died recently at his residence in Connellsville, Pa., after a brief but severe illness, in the thirty-sixth year of his age. Mr. Reynolds has been identified in various responsible capacities with the interests of the Connellsville coke region for about 15 years, and was highly esteemed by all who were brought into contact with him.

Triple Power Hydraulic Shear Legs.

A short time ago Mr. G. Richou gave, in *Le Génie Civil*, an account of the triple power hydraulic shear legs erected at Marseilles, France. From an abstract of his article, just published in the "Excerpt Minutes of the Proceedings of the British Institution of Civil Engineers," we take the following:

The shear legs constructed for the port of Marseilles, by the Fives-Lille Company, and placed on the quay near the graving-docks, had to be designed to lift a load from a vessel alongside the quay and deposit it on a wagon or truck near the edge of the quay for its head to be able to advance 29½ feet beyond the edge of the quay, and to recede 16½ feet behind it, and its height such that the load could be lifted over 23 feet above the quay level. It had to be made to work, at pleasure, at powers of 25, 75 and 120 tons, with a proportionate expenditure of water, and to be provided with a capstan for conveying the loaded truck directly beneath it and for removing them.

To illustrate the novel arrangements introduced in these shear legs, the author commences with references to some of the shear legs previously erected. The old type consisted of two shear legs fixed apart, one behind the other, at the bottom, but connected at the top, hanging over the quay to the requisite extent, and maintained in a fixed position by ties anchored in the masonry. The lifting was effected by pulleys fastened to the tops of the shear legs, and moved by hand winches or capstans, whilst other pulleys were required to draw the load on to the quay. These shear legs required a number of men, and their greatest power was 40 tons. The increased power required for handling the large guns of ironclads and marine boilers has led to the adoption of shear legs, similarly fixed, but worked by steam or hydraulic power, of which, among those made within the last 20 years, may be cited the shear legs erected at Toulon, Antwerp, Spezia and Elswick. The machine at Toulon, constructed in 1867, consists of a couple of fixed shear legs, connected at the top by a strong girder, on which the trolley runs which shifts the load. One steam winch lifts the load, and another shifts its position. The motive force is an engine of 30 horse-power, and the maximum power is 50 tons. The shears erected at Antwerp in 1878 has three legs, connected at the top by a steel axle; a hydraulic machine with three cylinders works alternately a winch carrying a cable for lifting and two endless screws, which move the bottom of the hinder leg, and, causing the two other legs to turn on two pivots fastened on the quay wall, shift the load horizontally. The working is simple, but the toothed gearing and endless screws produce considerable friction, and are not suited for accelerated working, which is sometimes necessary. The three-legged oscillating shears at the Elswick gun factory transports the load like the Antwerp shears, but the lifting is effected by the aid of a hydraulic cylinder suspended from the shears. The lifting is similarly effected by the shears at the Spezia arsenal, also erected by Sir W. G. Armstrong & Co., but the horizontal movement is produced by the rotation of the shears. Both these last-named shears can lift 160 tons.

The new shears at Marseilles are three-legged and oscillating, like those of Antwerp and Elswick, and with direct action, both for the lifting and the horizontal motion. The piston of a hydraulic press, acting upon the bottom of the hinder leg, effects the oscillating movement; and another hydraulic press, suspended from the top of the shears, accomplishes the lift-

ing. An automatic multiplying apparatus causes the water pressure to be increased for lifting loads of between 75 and 120 tons, and to be reduced for loads of between 75 and 25 tons. An accumulator holds in readiness the greater portion of the water, under pressure, required for one operation. An apparatus, furnished with cables, erected on the back of the hinder leg of the shears, serves for accessory operations and for lifting loads not exceeding 8 tons. Lastly, a suspended platform, on which the conductor stands, enables supervision to be exercised close at hand over all the operations. The hydraulic cylinder for lifting, instead of being hung from the top, as at Elswick and Spezia, which is liable to cause leakages and thus impair the power of the machine, is suspended from its forged steel bottom by two steel rods, fastened to the top of the shears by a Cardan joint, relieving the cylinder from the strain of the load, and affording it the required mobility. The diameter of the cylinder is 1½ feet, having been calculated for a mean power of 75 tons, with a water-pressure of 710 pounds per square inch. The automatic multiplier is used for powers of 25 and 120 tons, consisting of two cylinders, placed end to end and fastened together by rods, in which two pistons of different diameters work. Two of these machines, placed side by side and coupled, insure a continuous motion of the load when lifted. The water-pressure, which continues uniform, is directed against the larger or smaller piston, according as the water-pressure in the lifting cylinder is to be increased or diminished; for the larger piston, acting on the smaller piston, increases the pressure of the water delivered into the lifting cylinder in proportion to their diameters—namely, up to from 1280 to 1420 pounds on the square inch; while, when the smaller piston acts on the larger piston, the pressure is proportionately reduced. The diameter of the large piston is 1.1 foot; of the smaller piston, 10 inches, and of the connecting rod, 9½ inches, and the length of stroke is 3.28 feet. The maximum height of lift, of 46 feet, can be accomplished, in case of need, in 28 seconds. The shear legs were tested, in August, 1887, with a load of 140 tons, and worked perfectly. The efficiency of this machine, with direct action, is much greater than where the power is transmitted by cables, and for loads of 75 to 80 tons, not requiring the intervention of the multiplier, is at least 90 per cent., instead of an efficiency of only 25 per cent. for the type of shears like those at Antwerp.

Corporations were recently organized in Illinois as follows: The Fox Solid Pressed Steel Company, at Chicago; capital, \$500,000; incorporators, Charles S. Holt, Colvin C. H. Fyffe, Arthur D. Wheeler. Chicago Carriage Lamp Company, at Chicago; capital, \$15,000; incorporators, John H. Kaiser, Jr., Charles H. Engel and Frau L. Brooke. The Universal Heating Company, at Chicago; capital, \$50,000; incorporators, Lewis K. Curlett, Henry Boyce, W. Knox Haynes. Sim Foundry Company, at Chicago; capital, \$12,000; incorporators, Justin R. Graves, John C. Armstrong, Martin M. Gridley. National Implement Company, at Aurora; capital, \$200,000; incorporators, W. H. Craddock, Frank D. Ray and William D. Goodnow. A certificate was filed changing the name of the Larm Mfg. Company, of Chicago, to the Harmless Spur Wire Company.

At New Orleans the freight rate on cotton to Liverpool has advanced 10 over 1 cent a pound, the highest point reached in many years. Ocean freights are high all over the world.

A TALK ON STEEL.

One of the features of the Scranton meeting of the American Society of Mechanical Engineers was the discussion of the query, "What experiences and phenomena can you describe as to the conduct of steels under the conditions in which you were using them?" At a previous meeting of the society so much interest had been manifested on the subject that it had been deemed desirable to give a more than ordinarily long allowance of time to this topic, and written and oral contributions had, therefore, been freely invited.

As a result Mr. W. W. Dingee wrote to the effect that the J. I. Case Threshing Machine Company use large amounts of machinery steel in the manufacture of threshing-cylinder teeth. This steel cannot be hardened with any certainty by any of the usual methods. The chief trouble with it comes from its uneven texture. It is not very uncommon to find a bar that may be broken like cast steel, when within a short distance of the break it can be bent cold.

Mr. Wm. Kent had sent samples of trusses for torsion balances, with spring steel wires stretched upon them, that had been under test for some months past in the factory of the Springer Torsion Balance Company. The longest of the three wires on the double truss had been twisted through an angle of 45° —that is, $22\frac{1}{2}^\circ$ each side of its normal position 7,100,000 times. The two shorter wires on the single trusses had been twisted through an angle of 16° 2,200,000 times. These wires were stretched originally to the notes C sharp and D above the staff respectively. After they had been twisted 1,000,000 times each the tone was tried again, and one of the wires appeared to have a tone half a semitone higher, and the other was about half a semitone lower than when the test was begun, possibly a mistake in the original tuning. After they had been twisted 2,000,000 times each the tone was found to be same as it was after 1,000,000 twists. As regards steel of low tensile strength Mr. Kent said: "The lowest tensile strength I have ever found in steel was 42,000 pounds per square inch. It was American open-hearth steel made for horseshoe nails. The composition was about, carbon, 0.10; phosphorus, 0.012; manganese, 0.20; silicon, 0.02. It was necessary to keep the phosphorus extremely low to secure the low tensile strength and great ductility desired." Concerning high tensile strength of watchspring steel Mr. Kent said: "Some three years ago I procured 13 samples of watchsprings and tested them for tensile strength in a crude apparatus in which a strong spring balance was used to indicate the strain. The springs included a Jurgensen main spring, an English, a Waltham, a Waterbury and several other springs of various sizes and different tempers. The tensile strength of the whole lot of 13 varied between the limits of 300,000 and 375,000 pounds per square inch, a much less variation than might be expected considering the variety of sizes, tempers and sources from which they were obtained."

Mr. George R. Stetson had sent a broken drill. The singular regularity of the fracture was peculiar. The break was not at a shoulder, but about 1 inch from it. This piece of steel broke during the night after having been in the hands of a workman for several hours. The shank was forged from larger stock, and cooled by dipping in water. There was heat enough to harden it somewhat. The cooling no doubt caused the fracture, but why it should have taken several hours before the break occurred is difficult to understand. The steel stood rough handling, but broke during the night while lying on a machine,

part being found on the floor. Mr. Stetson did not think it a good practice to hurry the cooling of steel in this way, although the water annealing of steel is usually satisfactory if carefully done. This breaking after hardening is not unusual, sometimes not developing for several days. One of the members spoke of such an incident happening after months. There may be foundation for the belief that clock and watch springs break during a thunder shower more frequently than at other times, and that a razor is improved in cutting qualities after lying unused for some time. He forwarded part of a large tap broken in hardening. The imperfection of the steel was apparent. Such a fracture is common with large tools; whether large tools that do not break have this imperfection or not it is impossible to know. The majority of sizes, 4 inches and above, that do not break show irregularity in grain. The question naturally arises, Why should so slight a cause produce this result? The most common breakage of taps in hardening is at about 1 diameter from the entering end of the tap. By screwing an iron washer over this end of the tool to keep the water from it this breakage, it was thought, could be lessened. This could be done by tapping out the center for a small machine screw, and holding the washer against the tool by this screw. Samples of drills cracked in hardening were shown. Much the larger loss from breakage on drills, larger than $\frac{1}{4}$ inch, show this peculiar fracture. It is not confined to any part of the twist, though the samples are toward the shank or solid part of the drill. There was a peculiar uniformity in the fracture, and in all the hundreds which had been noticed the fracture never is reversed or pointing toward the shank.

Mr. E. Fawcett said: "Some time since we had occasion to make some large taps and dies for bridge bolts, and being in a hurry, the forger in annealing left them in a bed of charred (bituminous) coal on the forge over night to give them a good "soaking," as he called it. On working the steel we found it to have a very coarse crystalline structure and to be brittle. Needing them immediately, we finished them up, tempered and put them to work. One of them broke after threading some hundreds of nuts, but did not show as large a crystalline structure as before tempering; the others have been in use ever since. The steel was ordered for the special purpose from a well-known manufacturer in Pittsburgh, and had every appearance of being first class."

Mr. Levi K. Fuller said: In 1885 I had occasion to make a series of dies and punches for the Estey Organ Company, to be used in punching sheet brass for reeds, both block and tongue, for use in their organs. The steel was No. 4, Sanderson Brothers Steel Company, Syracuse, N. Y. The bar was cut into various sizes in a planer, heated in a charcoal fire and annealed in wood ashes. The specimens were then planed to various sizes and thicknesses, ranging from $1\frac{1}{8} \times \frac{1}{4} \times 3$ to $\frac{1}{2} \times 3 \times 3$. These were heated to a bright red, in accordance with the instructions printed upon the label on the bar of steel, and hardened in water and ground without the temper being drawn in the least. They were then subjected to grinding in an emery grinder to the proper sizes; they were ground on a frame but not confined, remaining loose so as to allow the steel to move, if there was any tendency in that direction. As the skin was removed upon one side the surface was slightly concaved, and they had to be turned over and ground upon opposite sides five times before they ceased changing their form. The various blocks were planed 0.010 thicker than the finished size to allow for grinding. They were ground 0.0001 inch alternately on each side, receiving a total of five grindings upon

each side, reducing the total thickness 0.10 inch as above stated. After they had been ground a few hours, they began to crack, and nearly every one was ruined by reason of this tendency. In some cases they would break into a dozen pieces. I had communicated with Sanderson Brothers Steel Company, and they attributed the fact to overheating, but the description "a bright red" had been strictly followed, and had been none too high for similar steel for a like use. Samples of this were sent to Sanderson Brothers and tempered by them, and the temper slightly drawn, but it was not sufficiently hard to do the work. We then resorted to steel No. 5, same make, which had precisely the same treatment as first described, and which has resulted in no case in breakage. The work performed by the sample returned to us by the Sandersons was the punching of 5000 reeds without regrinding, while the No. 5 will punch 20,000, and with some thicknesses even more. The dies were perfectly square and were set with a piece of tissue paper 0.0005 in thickness between them, cutting a perfectly smooth edge.

Mr. Chas. L. Houston wrote: "In the discussion at the Nashville meeting as to the significance of the peculiar curved lines which appear in the disturbance of the surface scale of steel boiler plates, caused by the strains of shearing, some of the members claimed that it was only a scale disturbance, and it did not indicate any injury to the metal. I have reason to believe, however, that it is an indication of injury to the body of the metal, and send herewith a piece of plate which had been so affected and afterward was stretched and broken in a testing machine. The lines show very plainly that the metal had been strained beyond its elastic limit, not only upon the surface but to some depth (as shown on the edges of test piece), so that when afterward it was stretched it did not so readily yield at these points, leaving elevations of slight extent upon the surface. The lines upon this sample are not so much the peculiar curved ones, the result of shearing, as they are those resulting from the curling of the narrow scrap at the shears and the subsequent straightening to prepare for testing. I have observed, as also have many other workers of steel, that metal of some degree of ductility when subjected to strains will sometimes crack like glass, showing no evidence of ductility at the point of fracture. I noticed some five years ago one striking case of a $\frac{1}{4}$ plate of American made basic steel, which was sent to a locomotive works to try its flanging qualities. It was flanged into a locomotive throat sheet, the edges being first turned down and then the concave end worked out. The next morning a crack appeared at the opposite end which had not been heated at all, and had had the roughness of shearing removed by planing. This crack continued to extend for a week or ten days, until it reached the whole way across to the part that had been heated. This, of course, was due to the contracting strain at the flanged end, and the sides of the crack showed little or no evidences of having reduced or stretched at the fracture. I had a test piece taken from one side of the crack and prepared so that when pulled it had the crystalline face of the crack for one edge of the test piece. The test, taken nearly across the grain of rolling, showed a tensile strength of 68,580 pounds per square inch and a reduction of area of 42 per cent., with a fibrous fracture. I send one end of this piece, which, however, is almost too old and rusty to show its character. I also send some numbers of the *Journal* of the Franklin Institute, showing the results of some curious tests made by my father. One series, 1878, shows that steel and iron both when raised to

about 600° heat F. lose in ductility and gain in tensile strength; this is also corroborated by bending and tensile tests made in Europe and translated for the *Journal* of the Franklin Institute in 1885. Another set of my father's tests shows the effect of straining iron up to nearly its elastic limit and continuing the strain for 24 hours or more, the result being in some cases raising the elastic limit almost to the ultimate strength of the material."

Mr. Chas. T. Main remarked: During the year of 1883, when arranging the driving system of the Lower Pacific Mills, at Lawrence, Mass., it was thought that steel shafts for head lengths would be stronger and more desirable than iron. Accordingly quite a large number of these of 4 and 5 inches diameter were put in. The calculated sizes were amply sufficient to carry their respective loads, and the shafts were well supported by hangers near the pulleys and were firmly held. In less than a year two 5-inch shafts had broken in one place, and one in another place, and four 4-inch shafts had broken. These were replaced with forged iron shafts, which were subjected to the same conditions of load, speed, &c., the bearings remaining the same as before. The 5-inch shafts are still running under the same conditions. The 4-inch shafts are still running, although the conditions have more recently been changed. The other steel head lengths which did not break were all changed for iron with one exception, which still remains as it was.

Mr. H. D. Hibbard, of the Linden Steel Company, of Pittsburgh, called attention to the importance of giving as far as possible the history of the steel under consideration. "To those not engaged in its manufacture," he remarked, "steel is steel, but not necessarily so to those engaged in the business. Unless the history of its manufacture is known much of the other information about it is useless. Even with the chemical analysis known, which is essential, the great variations in physical properties due to different methods of manufacture and subsequent treatment may account for any anomalies, and unless these are known the mysterious element of the symposium will not be kept at a minimum. As no two plants are alike, no two methods alike, and no two men alike, the most complete description of the steel would indicate the name of the firm and man who made the steel. Then would follow the subsequent manipulation to put the steel in shape for use. Even then the mishaps it has met with from bad workmanship will never be known."

Mr. Oberlin Smith presented the case of a set of steel dies 4 inches square and 1 inch thick, in hardening which the jaws were found to crack so frequently that a large loss resulted. The explanation, of course, was that the relatively small jaws cooled so quickly, as compared with the large body of the die, that violent strains were set up. As a remedy, an arrangement was adopted by which the die, while undergoing hardening, was slowly revolved in a vertical plane and gradually lowered into the cooling liquid. The cooling thus proceeded from the outside, the outside corners first being acted upon. These occasionally cracked off, but only in a very small number of cases, and the method proved highly satisfactory. In hardening taps, Mr. Smith had found the outside portion to crack off in many instances. To obviate this, he recommended drilling a hole in the middle of one end, thus allowing the water to act on the inside and outside at the same time, in this way equalizing the strains resulting from cooling. Mr. Smith further attributed irregular strains in a great measure to lack of homogeneity in rolling or casting. Burning of the metal, he thought, resulted from the action of the air-blast in a forge, and, as a remedy, suggested a deep fire

and exposure of the metal to radiated heat only.

Mr. J. E. Denton referred to the breaking of iron shafts on six Hoboken ferry-boats within one winter. One of the shafts had been in service less than a year and the others for periods of from three to five years. The breakage, it was thought, resulted from the adoption of iron paddles in place of wooden ones, but subsequent experiments showed them to be fully capable of withstanding the increased strain. Mr. Denton referred also to the breakage of Krupp-steel shafts on the Allegheny River, the steel in all cases having been found to be of good quality. As to the influence of the nature of the strain in producing fracture, attention was drawn to experiments with watch springs, which showed that if the strain was only small enough it could be applied an infinite number of times without damage.

Prof. John E. Sweet, in referring to hardened steel for standard gauges, remarked that length pieces were found to constantly change after hardening. With cylindrical pieces also, after having been accurately ground, it was found that after standing on end a few hours they became enlarged in diameter in a north and south direction. In order to prevent a change in length of gauges Mr. Geo. M. Bond suggested leaving the gauges unfinished for six or eight months after hardening. The strains due to hardening, he remarked, were greatest at the end, and all gauges, before being sent out for use, should be heated a second time to a temperature higher than any they may be liable to encounter in practical use. Tests have shown such second heating to shorten the pieces. In the matter of equalizing the strains in taps from cooling Mr. Bond recommended drilling a hole clear through each tap, this having worked well with 6, 9 and 10 inch bridge taps. Mr. Bond further cited the case of a gauge $2\frac{1}{4}$ inches in diameter, which, four days after having been hardened and finished, cracked through the middle, measurement, moreover, showing the end diameters to have become enlarged.

Capt. Robert W. Hunt spoke in an interesting manner of the effect of manganese on steel for gun barrels. During the Turko-Russian war the Winchester and the Smith & Wesson companies, it appears, had in hand large contracts for guns. Both firms for a time used imported steel. The Winchester Company wanted for their purposes soft octagon steel which would give a short chip in boring. In supplying such steel in this country it was found necessary to keep the manganese down to about 0.4 per cent., an increase over this causing a long chip and a rougher bored surface. As to the quality of steel, Captain Hunt held that primarily it was all good, but the men who handled it were careless and largely responsible for the erratic behavior of the metal. The quality of steel rails, he thought, was actually deteriorating, but as to the good old rails of which we sometimes hear—they had been shown to be chemically mean, the phosphorus often running from 0.07 to 0.15 per cent. The reason of their good behavior in use was purely physical, the steel being worked at a lower temperature.

Mr. F. H. Richards, in speaking of taps and dies, remarked among other things that in some New England shops forging small steel tools was considered a failure and orders had been given that such tools should be cut from the solid. Mr. Oberlin Smith remarked that hardening sometimes caused steel rings to swell and sometimes to contract. Mr. Barr cited the case of 50 taps in which, after hardening and finishing, the threaded portions were alike in less than 6 pieces. Mr. Jerome Wheelock spoke of tempering valve stems $2\frac{1}{4}$ inches in diameter and 9 feet long. These are kept below scaling heat and

dropped into the water vertically. This method was almost uniformly successful. Prof. F. R. Hutton referred to some of the steel castings which had been turned out for the new war vessels built at Cramp's. In these heavy castings sharp angles had been carefully avoided. Mr. W. E. Crane, in closing the discussion, spoke of the shrinking by rehardening of the dies used in drawing brass tubes.

The Carnegie Concerns.

In our issue of last week we made mention of the fact that some important changes in the firm of Carnegie Bros. & Co., Limited, and Carnegie, Phipps & Co., Limited, at Pittsburgh, had taken place. Since that time some additional facts in regard to the changes have been brought out. The reason for the retirement of Henry Phipps, Jr., is his serious ill-health which threatened to become more serious if he continued in active service. The retirement of John Walker, who held the position of Chairman of Carnegie, Phipps & Co., Limited, was caused by difference of opinion between himself and Andrew Carnegie dating back to the big coke strike and subsequent events. Both gentlemen, however, severed their business relations with the understanding that the friendly personal relations would continue without interruption. On Thursday, the 18th inst., another change in the firm of Carnegie, Phipps & Co., Limited, occurred, E. A. Macrum who has held the position of treasurer of that firm for a number of years resigned and was succeeded by Lawrence P. Phipps, who is a nephew of Henry Phipps, Jr. On account of the many false rumors set afloat by the changes made in the firm the following statement was prepared and given out by Andrew Carnegie on the day after the changes were made.

At the request of Mr. Henry Phipps, Jr., Mr. D. A. Stewart was yesterday unanimously elected chairman of Carnegie Bros. & Co., Limited. Mr. Stewart, as is well known, has been one of the leading officers of the firm since its inception. He has for many years occupied the position of vice-chairman and attended to the duties of chairman during Mr. Phipps's absence. Mr. Phipps concluded his 28th year in the iron business this month, and felt that he should now be relieved from routine duties. His partners felt that he had deserved from them anything he asked, and gladly acquiesced. He is hereafter to occupy a similar position to that always occupied by Mr. Carnegie, that of consulting partner without salary. As heretofore, he will have full charge of all the finances of the various concerns. He retains his position in the firm as the principal partner next to Mr. Carnegie. Mr. John G. A. Leishman was elected vice-chairman. These changes required some corresponding changes in the firm of Carnegie, Phipps & Co., Limited, Mr. John Walker having sold his interest to the younger members of the firm. Mr. Wm. L. Abbott was elected chairman of Carnegie, Phipps & Co., Limited; Mr. H. M. Curry was elected vice-chairman and Mr. W. F. Palmer was elected secretary. Mr. Abbott entered the service of the firm 17 years ago, when quite a lad, at a small salary, and has risen step by step to his present position, having developed as he progressed. He was heartily congratulated by every one of his associates upon his deserved promotion, and enters upon the chief command with their cordial good wishes. Mr. Curry has been 16 years in the firm's service, having begun like Mr. Abbott as a young man at a small salary. All his partners rejoice over his fully earned promotion. Mr. Palmer, who has been promoted, has won his spurs by many years of distinguished service, and has been admitted to the firm as partner as his just reward. All other officials remain as before. In making these necessary changes the firm have adhered strictly to their well-known policy of promoting those of their own young men who have proved their ability and zeal during long years of service.

Carnegie, Phipps & Co., Limited, control the Homestead Steel Works at Homestead, Pa., the Lucy furnaces at Pittsburgh, and the Seventy-ninth Street Iron Works, or Lower Union Mills, also in that city. Carnegie Brothers & Co., Limited,

control the Edgar Thomson Steel Works at Braddock and the seven blast furnaces at that place, and also the Union Iron Mills on Thirty-third street, Pittsburgh. It is reliably stated that further changes are contemplated in both firms and will be made at an early day.

Providence Notes.

In a locked room in a shop in Pawtucket stands a machine, the invention of a Rhode Island gentleman, whose reputation as a civil and mechanical engineer is not confined to this country alone. It is a machine for making horseshoe nails, and represents seven years of experiment and study by Mr. John A. Coleman and the expenditure of tens of thousands of dollars. It is fully protected by patents, and, in the opinion of competent judges, men engaged in just this line of business, is destined to work a revolution in that industry. Across the room stands a larger machine designed for the same purpose, an admirable piece of work, but abandoned in the matter of some of its details now for the simpler form of the completed mechanism. A belt run through the partition brings the power, and, although the machine is not as yet run for commercial profit, several barrels of the finished product turned out during the perfecting of the mechanism are stowed in one corner of the room. The object sought was to make a nail which would be tougher than those in general use, which would not split and which would not crack the hoof—in short, a better nail in every way than any now in use. Mr. Coleman makes his nails by cold drawing from blanks considerably shorter than the finished article. The machine which takes advantage of simple natural laws is strictly automatic, the only attention required being that a supply of blanks shall be furnished, and these may be delivered in a tangle just as they are dumped out of a keg, and that the machine shall be kept well oiled. The essential parts are few in number and positive in action—in fact, the whole machine is wonderfully simple when the work it does is considered. The finished nails have as fine a polish as if rattled, and a long, even taper to a point as keen as a needle's. A new nail just from the machine dropped from the height of a person's waist will stick upright in the floor at one's feet. These nails have been thoroughly and satisfactorily tested in competition with standard makes of horseshoe nails. Although the machine is larger than its commercial issue will be, as it represents the evolution due to years of thought and development, it presents an interesting study in the manifest employment of the most direct means to effect a desired result, and is mechanically very satisfying. The machine will occupy but little floor space, and its design combines grace with ample strength. It is attracting much attention from men in the horse-nail and allied industries, and within a few days the managers of a company of ironworkers, employing upward of 5000 hands, spent nearly half a day in inspecting the machine with a view to negotiating.

The New York, Providence and Boston Railroad has introduced a time-saving device in charging the cylinders of its gas-lighted cars. Formerly, cars were held at Stonington until their reservoirs were filled, a proceeding which frequently caused delay. Now, a car containing five large reservoirs has been put in service. This is charged at the Stonington gas plant in the company's yard, and the car is taken to New London, the car being charged while cars are waiting at that station, and obviating unnecessary delay.

The Edison Electric Light Company propose to lay an underground line through Thames street, Newport, which will be

connected with their station on the hill by a pole line via Church street. Although the city authorities have not given permission to lay the wires, which they have no right to do, the company having never received a charter, it is understood that they will make no objection, and already the paving blocks along the east curb of the street are being removed so that the trench for wires may be dug.

The contract for lighting the new steamer Puritan, of the Fall River Line, has been awarded to the Edison Electric Lighting Company. There will be 1600 lamps of 16 candle-power each, for which current will be furnished by four 400 light dynamos. Two "straight line" engines will be motive power for the plant. The steamers Bristol, Providence and Pilgrim, of this line are also lighted by the Edison system, Armstrong & Sims engines being used as the driving power.

The improvements of the New York, Providence and Boston Railroad Company in and about this city have been extensive during the past three or four years. The latest improvement under way is the purchase of land between the railway and the projection of West Exchange street. It is a narrow tract on the south side of the railroad, containing four acres, or 174,240 square feet, and is undoubtedly the largest piece of land that has changed hands in this city for a long time. The company have begun their improvements by building a new engine-house, which will contain stalls for 20 engines, while from the building to the Atwell's avenue bridge tracks will be laid, principally for freight cars which are to be unloaded.

The Corliss Mfg. Company of this city have just finished three large boilers for the City Mfg. Company, of New Bedford, Mass.

LEONIDAS.

The Jennings-Beale Case.

The Supreme Court, at Pittsburgh, heard arguments on the appeal of B. F. Jennings, John Davis and T. D. Jenkins from the Court of Common Pleas, of Armstrong County. Joseph G. Beale, together with Robert Flenniken and the defendants, formed the iron firm of Jennings, Beale & Co., Limited, which was engaged at Leechburg in manufacturing steel billets of the Siemens-Martin open-hearth process. In July last Beale filed a bill in equity against the other members in the firm, alleging that they were about to move the works without his consent at a cost of \$20,000, which would work him irreparable injury. This, it was claimed by Beale, was in violation of the partnership articles, and, as he had lost confidence in the defendants, believing they were attempting to ruin the business, he asked for an injunction and the appointment of a receiver. The Common Pleas Court granted an injunction, and from this decision the defendants appealed. The defendants alleged that Beale, as manager of the works, was incompetent, and for that reason and because of trouble with the Amalgamated Association, a majority of the firm considered it advisable to remove the furnaces to some place near the residence of the Chairman, B. F. Jennings, that he might personally supervise the manufacture of the billets. The allegation that the defendants were trying to ruin the business is stoutly denied. The counsel for Mr. Beale intimates that the defendants are endeavoring to squeeze Beale out of the firm, and alleges that the trouble with the Amalgamated Association was occasioned by Mr. Jennings recklessly discharging men and precipitating labor troubles on the firm, which could have been avoided by a removal to Allegheny County. It is further alleged that Mr. Jennings became so reckless that he began dismantling the furnace and loading it on cars for transportation before he had

secured a site for its re-erection. This removal would cost \$25,000 to \$30,000, the foundations would be a total loss and the new plant would involve an additional and needless expense of \$23 per day.

The troubles in the management of this firm were before the Supreme Court at its recent session, in Philadelphia.

Torpedo Boats.

The naval maneuvers of 1887 abroad confirmed the opinion formed in 1886 that torpedo boats of small tonnage are not adapted for service at sea, and that their field of operations is restricted to operations on or near the coast and in harbors. The tendency at present is to build boats exceeding 130 feet in length, with displacements ranging above 90 tons, carrying machine and rapid-fire guns in addition to the torpedo armament. European powers have begun but a comparatively small number of torpedo boats during the present year, although a large number have been added to the strength of the fleets; but these have, in a majority of cases, been completed in fulfillment of old contracts. In general, it may be fairly said that the smaller type of torpedo boat, so highly thought of in 1885, has lost much of its prestige. The principal sources of weakness in the smaller boats have been found to lie in inefficient boilers and light construction of hull. A new boiler, invented by Messrs. Thornycroft & Co. has been largely adopted, and is giving very satisfactory results; and the tendency to work more material into the construction of the hull and protection of vital parts bids fair to overcome the second weakness noticeable in the earlier boats, in which so much was sacrificed for speed. The necessity of torpedo repair and supply vessels again made itself apparent during the naval maneuvers. In England a large and powerful vessel, the Vulcan, is building, and in Italy two vessels of this class are to be built. The Germans have appreciated the value of this class of vessel for some years, and have constructed division torpedo boats. These vessels are fitted with complete workshops and spare stores and are intended to accompany divisions of torpedo boats.

The difference of the speed of torpedo boats on trial and in actual service, almost always considerable, was well illustrated in the races of the English torpedo flotilla in the Channel, in which the victor attained a mean speed of but 16.25 knots per hour for five hours, while on the original measured mile it realized a speed of 21 knots. This was also illustrated in the competitive trials of Russian torpedo boats of various types in the Baltic in September last, the loss of speed amounting to $2\frac{1}{2}$ to 4 knots in boats but a year old. The single exception known to this rule is that of the Normand boat Sveaborg, which realized in this trial its original trial speed. The trials of the Nordenfjeldt submarine torpedo boats in England and Turkey have attracted considerable attention, and mark a new phase in torpedo warfare. Their present under-water speed of 4 or 5 knots is very low for efficient service against ships under way; but the attention of inventors and naval constructors is now directed to this type of boat, and doubtless it will be largely developed in the future. In a circular recently issued by the U. S. Navy Department calling for proposals for a submarine torpedo boat an under-water speed of 8 knots is deemed requisite. This circular probably indicates the most advanced thought and opinion in regard to submarine boats.

The Norway Steel and Iron Company of Boston, have decided to wind up their affairs and go out of business.

Iron in South Carolina.

South Carolina has so long been considered a purely agricultural State that it will be something of a surprise to many of the readers of *The Iron Age* to learn that almost as large an area of the State covers deposits of iron as constitute the iron region of Alabama, magnetic and specular ore are found in quantities on the Western slope of King's Mountain, in York, Spartanburg and Union Counties, also in Chester and Abbeville and in lesser quantities in many other counties of the State. Brown hematite is present in Pickens and Spartanburg Counties, and bog-iron ore can be found in every county in the State.

A century ago the iron mines of South Carolina were profitably worked, at which time there were seven furnaces in operation in the four counties of York, Anderson, Greenville and Spartanburg. The discontinuance of the industry was due in part the absence of cheap fuel, an obstacle which is now removed by the increase of railroad facilities and the development of coal mining at not a great distance.

The earliest record of iron making in South Carolina was in the year of 1773, when iron works were erected by Mr. Buffington, and which were destroyed by the Tories during the Revolution. Soon after the war several furnaces and forges were constructed, the more prominent being the Era and Etna Furnaces, in York County. The Era was erected in 1787 and the Etna the year after. The principal owner of these furnaces was William Hill, who is said to have invented a new blowing apparatus, which dispensed with the use of wheels, cylinders or other kinds of wind-producing apparatus. In 1802 an air furnace was built on Charleston Neck, and in 1810 there were two bloomeries in Spartanburg County, four in Pendleton, two in Greenville and one in York. About this time there was a small steel furnace and a nail factory. Five years later York County had, in addition to the plant already mentioned, a forge, a furnace, a rolling mill for making sheet iron, and a nail factory; and there were small iron works in several other localities.

As late as 1856 South Carolina had eight furnaces—one in York, one in Union, and six in Spartanburg County. Four of these furnaces then in operation produced 1506 tons of charcoal iron. The same year there were also three rolling mills—one each in Spartanburg, Union and York counties, and the three turned out 1210 tons of bar iron and nails. There were a couple of bloomeries in the State the same year. All of these furnaces and mills have since been discontinued on account of cheap methods of making iron having been inaugurated elsewhere.

The Magnetic Iron and Steel Company, recently chartered by the Secretary of State at Columbia, has purchased the greater part of the magnetic iron ore lode near the town of Blacks, in York County. The price paid for the property was \$60,000. The tract contains a large deposit of magnetic ore, low in phosphorus and silica. The company is composed of wealthy capitalists from Birmingham and Atlanta. It is their intention to build a furnace at once, and afterward a rolling mill, which in turn is to be followed by other industries. A town is to be laid off, and a boom systematically worked up, and none know how to do this so well as the Birmingham gentlemen interested in this project, which is freighted with so much importance to the iron future of South Carolina.

The new Charleston, Cincinnati and Chicago Railroad runs through the lands of this company and the officials of this road claim that they can deliver coal to the furnaces of the new iron company at \$2.50 a ton. There are large forests of

pine upon the lands of the company from which charcoal can be obtained, sufficient to supply the needs of a charcoal furnace. In close proximity to the ore beds purchased by the Magnetic Iron and Steel Company are also extensive deposits of Oolitic limestone. The Chesaw Iron Works will shortly begin the erection of a new brick foundry 90 x 30 feet.

A Travelling Crane Worked by Electricity.

It has become a custom with the mechanical section of the British Association to devote the Monday to papers connected with electrical engineering. The first paper read on that day was by Mr. W. Anderson, who described a 20-ton traveling crane worked by electricity. One of the traveling cranes in the foundry of the Erith Iron Works was originally constructed to be worked by hand; but preparations had been made to apply wire rope driving at some future time. The crane is 39 feet 6 inches span, and consists of a pair of wrought iron girders resting on end carriages running on an elevated line of rails. The gearing for hoisting and longitudinal and cross traverse is on the top of the main girders, the hoisting chain passes from the barrel at one end over a pulley at the other, then back to the pulleys in the cross traversing carriage, which runs between the main girders, through a falling block, and thence to an anchorage under the barrel at the extreme end of the main girders. By this arrangement the crane occupies a moderate height, and the hook can come within 3 feet of each wall.

The inconveniences and wear attending the employment of rope driving gear induced the author to try whether electricity might not be used with advantage. Messrs. Elwell-Parker, of Wolverhampton, were communicated with, and undertook to supply the dynamo and a motor suitable for the peculiar requirements of a heavy crane. The dynamo, which was intended to give 50 amperes at 120 volts with 1200 revolutions, was fixed in the main boiler house of the works, and was driven by a small horizontal engine by means of a link belt. The leads from the boiler house up to the conductor in the foundry are of 6 B.W.G. copper wire, while the conductor is formed of an angle iron bar 2 x 2 inches by 1/4 inch, extending the whole 350 feet length of the shop, and has one face roughly ground and protected from rust by vaseline. The return current travels along one of the rails on which the crane runs. The motor, which is shunt wound, and constructed for 100 volts and 50 amperes, is fixed on the working platform of the crane beside one of the main girders. Its driving spindle carries a steel pinion which gears into a double helical spur-wheel keyed on to a shaft which runs longitudinally on the top of the girder, and is connected by nests of three bevel wheels, with friction clutch connections to the three shafts which command the several movements of the crane; the means of using the hand power being still retained. Two sets of speeds are arranged for each of the movements, viz.:

	Feet per minute. Slow.	Feet per minute. Fast.
Hoisting.....	3.4	10
Cross traverse.....	25	105
Longitudinal traverse.....	78	213

To provide against undue strains upon the motor an automatic magnetic cut-out is fixed on the crane, in addition to a fusible cut-out in the main leads, and for the purpose of varying the power and speed to meet the requirements of the foundry, a set of resistance coils is provided, governed by a special switch, by means of which different resistances can be introduced into the armature circuit of the motor, or the

current can be cut off altogether; but so that it must be done by steps, and not suddenly, the connection between the motor and the conductors is by means of brushes pressed against them by elastic attachments. The handles for operating the several movements, the brake lever, the switch and the automatic cut-out, are collected together, so that a single attendant can readily work the crane from one spot. The crane was set to work in June last, and has continued to act satisfactorily ever since. As far as can be judged at present, there is no special wear to apprehend. The conductors act satisfactorily, though a considerable length is in the open air, and the dust, heat and smoke of the foundry do not appear to affect the working.

A New Heavy Grade Railway.—A correspondent of the *Times* gives an interesting description of the Brünig Railway, which has recently been opened between Lucerne and Bernese Oberland in Switzerland. The gradient is in places very steep, being as much as one in eight; and on this account special precautions had to be taken both in the up and the down journeys. Generally speaking, the Rigi system has been adopted. The locomotive turns a cog-wheel which runs on a toothed rack placed between the rails, and so the train slowly travels, or rather is dragged up hill. The cog-wheel is stopped, and the engine works in the ordinary way when a moderate gradient or level piece is met with. To check the too rapid descent of the train, the engine is fitted with a pneumatic counter-pressure action brake, which of itself is sufficient to stop the train. Besides this, each vehicle in the train is fitted up with a cog-wheel and rack similar to those used in the ascent, with drums on the axle to which clip-brakes are applied. By these appliances the speed can be regulated and the train stopped at any moment. There was another danger, however, incident to all railways to be encountered—namely the risk to the couplings during an ascent. Though the brakes on each vehicle would probably be sufficient in such a case, yet it was thought fit to take further precautions. When the train is at rest the brake is kept fully applied by heavy weights. These weights are lifted by steam-power, which is conveyed from the engine in flexible tubes. If a coupling breaks, the flexible tube conveying the steam also breaks, and the weights fall down automatically and check the motion of the carriages. It only remains to say that the gauge is a very narrow one, being only 1 m.

The report that the Kishpaugh mine, in New Jersey, has been abandoned because the vein had cut out proves to be incorrect. The facts are that the underground workings had gotten too far from the present slope to enable the managers to work economically. They have merely abandoned the old workings, the mine to be reopened on another part of the property when the iron business in New Jersey is in better shape.

In our description of the Loomis fuel gas plant at Tacony, Pa., published in *The Iron Age* of September 27, page 458, we stated erroneously that the exhaustor used was a No. 3 Root. The size is No. 6, having a 12-inch inlet, while No. 3 has only a 6-inch inlet.

The Lorain Mfg. Company, of Lorain, Ohio, have completed and are now occupying the additions to their plant made this summer, consisting of a planing mill 100 x 50 feet, for supplying the bathtub department, together with an iron foundry 200 x 90 feet, for increase of soil-pipe output. Their floors now cover an extent of three acres.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 96 and 97 Washington St.
CHICAGO, October 22, 1888.

Pig Iron.—No material change has occurred since our last report, but there seems to be a little more inquiry and the volume of business is a trifle larger. As yet the situation offers no comfort to the buyer who is looking for lower prices, but, on the contrary, the position of sellers is steadily growing stronger. The jobbing foundries are increasing their consumption, if anything, and, though the large contracts for Castings, mentioned last week, are still in abeyance, they are confidently expected to be secured for this city. In the meantime the supply of Pig Iron is diminishing, according to the latest authentic information concerning stocks in makers' hands. In the month of September the decrease in stocks of Coke Pig Iron held in the West was no less than 15 %, notwithstanding an increase in production. A similar condition of affairs exists in the Lake Superior Charcoal Iron trade. The total stocks are but half as large as those held by makers six months before. In view of these facts the resumption of operations by turnaces which have been out of blast for repairs, or because of unremunerative prices, need excite no apprehension of an immediate decline in values. It would appear that their product is really needed to supply the actual requirements of consumers. Some brands of Southern Coke Iron which had been withdrawn from this market are again being offered here, but in limited quantities. American Scotch (Blackband) Irons are practically out of buyers' reach, the furnaces being sold up for the present, and about \$22.50 being asked for No. 1 for future delivery. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$20 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; other Ohio Soft Irons, No. 1, \$17 @ \$18; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$18; No. 3, \$16 @ \$17; Southern Coke, No. 1 Foundry, \$17.75 @ \$18; No. 2 Foundry and No. 1 Soft, \$17.25; No. 3 Foundry and No. 2 Soft, \$16.50; Gray Forge, \$16.

Bar Iron.—Specifications for Car Irons are now making their appearance and some orders have already been placed. Mills quote 1.80¢ @ 1.85¢, flat, f.o.b. Chicago, for this business, but buyers allege their ability to find takers at 1.75¢. Contracts for more cars are on the carpet, and the mills are inclined to maintain their prices for Bar Iron in view of the large demand still to come from this source. While the miscellaneous demand for Bar Iron is not very heavy, consumers appear to be more urgent than usual for the prompt delivery of small lots. Jobbers are profiting from this state of trade and are running off their stocks rapidly. On ordinary specifications the mills quote 1.65¢ @ 1.70¢, f.o.b. mill. for Common Iron, half extras. Small lots are quoted at 1.90¢ @ 2¢ from store, according to quantity and quality.

Structural Iron.—Deliveries are being made on old contracts, but new business is very light, as is usual at this season. Small lots from store are quoted as follows: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢. On mill orders the following rates are named: Angles, 2.20¢ @ 2.25¢; Universal Plates, 2.25¢; Tees, 2.55¢ @ 2.65¢; Beams and Channels, 3.40¢.

Plates, Tubes, &c.—Business has improved very considerably in the past ten

days. With the approaching close of the navigation season, marine work is looking up, as repairs will be made when vessels go into winter quarters. The outlook for Tank and Boiler work is very good, as many contracts are now being figured on, and some good orders, particularly for Tank Iron, have already been booked. Store trade was much heavier than usual during the past week. Prices are firmly maintained all along the line. We quote prices from store as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % off.

Sheet Iron.—The urgency of the demand for light gauges is now about over, and the mills are getting their business in better shape, making shipments more promptly and taking new orders at more reasonable prices. Small lots from store are still held at 3.20¢ for No. 24, 3.30¢ for Nos. 25 and 26, and 3.40¢ for No. 27.

Galvanized Iron.—Manufacturers' agents report new business quieting down, but deliveries on old contracts are still far in arrears, and they are experiencing much difficulty in supplying their customers. Stocks are so badly broken that it will take some time to put the warehouses here in condition to meet the demands of the pick-up trade. Small lots are still quoted at 60 % off for Juniata and 60 and 5 % off for Charcoal.

Merchant Steel.—Some heavy orders for Spring Steel are reported to have been placed during the past week, and the demand has been very good among general consumers. The volume of business is considerably heavier than that of September. Association prices are still as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—The only business now in progress consists of small lots for the absolute requirements of the roads. Orders for next year are discussed, and from 75,000 to 80,000 tons will be purchased in the course of the coming month for such delivery, if present indications do not prove false. So far but one company is known to have ordered a supply of Rails for 1889. Although makers do not anticipate a large business next year, the fact cannot be overlooked that the situation is more encouraging than it was at this time last year, when no railroads whatever were anticipating their wants. Quotations continue at \$30 @ \$31.

Old Rails and Wheels.—No transactions have transpired in Old Iron Rails, the views of buyers and sellers having been too far apart for business. An offer of \$23.50 for 500 tons was refused by one holder, and \$24 was rejected by another. Old Car-Wheels are nominally quoted at \$19.50 @ \$20.

Scrap Iron.—A sale of 1000 tons of No. 1 Forge is reported at \$20. Old Horseshoes and Cast Machinery have met with some demand, and there have been free sales of low-grade Cast. Old Material is not at all abundant, and holders of Mixed Country Scrap ask \$15. Selling prices of carefully selected Scrap are as follows, per ton of 2000 lb: No. 1 Forge or Railroad Shop, \$20 @ \$20.50; Track, \$19 @ \$19.50; Horseshoes, \$20; Axles, \$26.50; No. 1 Mill, \$15.50 @ \$16.50; Pipes and Tank, \$12 @ \$13; Light Wrought, \$11; Cast Machinery, \$15; Stove Plate, \$12; Cast Borings, \$10; Wrought Turnings, \$12.50 @ \$13; Axle Turnings, \$15.50; Coil and Leaf Steel, \$17; Locomotive Tires, \$15.50.

Hardware.—Wholesale merchants generally are busier than they were last week and are doing a more satisfactory trade than in September. The demand then ran largely into heavy goods, while now more Shelf Hardware is moving, making the aggregate of sales greater. An effort is being made to advance the price of Nuts, and the quotations sent out by different manufacturers seem to corroborate the report to that effect. Inquiries for Nuts and similar goods are increasing, as is always the case on an advancing market. Washers, however, are a drug, the demand for them being very light. Collections are improving and are very satisfactory in numerous sections.

Nails.—Manufacturers' agents report a scattering demand, which, however, has made a fair volume of trade in the aggregate, without special activity. Wire Nails seem to be moving a little more freely than Cut Nails, both from factory and store. Manufacturers' prices are now \$1.90 @ \$1.95, f.o.b. Chicago, for Steel Nails, and \$2.55, same delivery, for Wire Nails. There are influences at work in the Cut-Nail market, however, which bid fair to demoralize manufacturers' prices very seriously if an understanding is not soon reached. The regular price for small lots from store is \$2.10 for Steel Nails, and \$2.60 for Wire Nails.

Barb Wire.—Business is stagnant, and jobbers' prices are unchanged at 2.90¢ for Painted and 3.60¢ @ 3.65¢ for Galvanized.

Pig Lead.—Business has been at a standstill, in consequence of the failure of N. Corwith & Co., who came to grief as a result of their efforts to corner the supply of Lead. The local interests in Lead and its products do not seem to have been seriously affected, but it will take some little time to ascertain the full consequences of the failure, and meanwhile all parties will proceed cautiously. An impression prevails that the firm will be found to have assets sufficient to discharge their liabilities.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.
PHILADELPHIA, Pa., October 23, 1888.

Pig Iron.—There is no perceptible change in the condition of the market, demand and supply being very evenly balanced. The feeling is one of steady firmness, consumers' requirements being sufficiently urgent to keep them continually in the market; and, as producers have no difficulty in placing their entire output, prices are naturally firm. In some cases sellers claim to be getting a little more money, which may perhaps be the case for small lots, quick delivery, but there are no indications of such a tendency in the general market. As already stated, prices are firm, but buyers are not inclined to contract for deliveries beyond the balance of the year, so that for the present values are not likely to show much change. A great many orders are said to be waiting for the result of the elections, and with the generally satisfactory condition of business it is thought that prices will advance if the Republican candidate wins. But the supply of Iron is very large, and will probably be larger still under the contingency mentioned, so that there may be some disappointment in regard to the matter of higher prices. And for the same reason there may not be the immediate decline which some people are predicting in case of a Democratic success. Apart from politics, the business is very satisfactory and for the time being there is no apparent reason for its being otherwise, hence the chances are that the volume of business will be large and prices steady, no matter who is elected. Meanwhile business in Pig Iron as regards future de-

liveries is held in abeyance, until matters are decided pro or con, prices being from \$16 to \$17, at tide, for Gray Forge; \$17 @ \$18 for No. 2 Foundry, and \$18 @ \$19.50 for No. 1, the majority of transactions being at medium figures, unless for strictly choice brands, which command outside prices. The scarcity of local Irons has been sufficiently marked to permit several lots of Southern and Western makes to be brought in, at prices within the limits above named, but the quantity taken was not large.

Blooms.—Fairly active at quoted rates, as follows: Nail Slabs, \$29 @ \$29.50, at mill; Billets from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 for "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$30 @ \$31 for Nail Slabs; \$34 @ \$36 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—The scarcity continues, and good Bars would command \$30 delivered, although some sellers quote \$30.50 firm. Latest sales reported were at \$29.50 @ \$30, but it might be difficult to duplicate purchases in the present firm condition of the market.

Bar Iron.—There is a renewed inquiry for Bars from car builders, with prospects of several large lots being closed in course of a few days. Country and Western mills are said to have named low figures, but city mills are still firm at last week's prices, with a good deal of work to be got out within the next four or five weeks. Still, buyers can probably do a shade better than last week, as the capacity in operation requires an enormous amount of business, which manufacturers are willing to accept at about to-day's prices, say from 1.8¢ to 1.95¢, according to quantity, quality, specification of sizes, &c. Skelp Iron is firmly held at from 1.95¢ to 2¢, with several large sales reported at the inside figure. The demand does not appear to have been fully satisfied yet, and 2¢ is asked for early deliveries.

Plate and Tank Iron.—The week's business has been fairly satisfactory to sellers, but no changes in prices have been made, although they are somewhat firmer than they were during the early part of the month. The general demand for Plates has been very good, but the activity at the mills is largely due to this class of trade—viz., carload up to 50 or 100 ton lots. Large orders are expected to be on the market at an early date, chiefly from the shipyards, which, when secured, will give the mills a good start for their winter work. Prices are quoted as before—viz., Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Sheet Iron.—A very heavy demand is reported, and mills are all completely cleaned out of stock. They are now running to their full capacity, endeavoring to meet the calls made upon them, but find great difficulty in doing so. Prices are firm at about the following for the best makes:

Best Refined, Nos. 26, 27 and 28.... 3¼ @ 3½¢
Best Refined, Nos. 18 to 25.... 3 @ 3½¢
Common, ½¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28.... 4¼ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25.... 4 @ 4½¢
Best Bloom Sheets, Nos. 16 to 21.... 3½ @ 3¾¢
Blue Annealed..... 2.8 @ 3 ¢
Best Bloom, Galvanized, discount..... 62½ %
Common, discount..... 67½ %

Structural Iron.—There is no improvement in this department, new business being very much less than the current output. Many of the larger mills are running on short time, and, as far as we can learn, none are engaged up to their full

capacity. New work is being talked about, but it is hardly likely that much business will be done until after the election. Meanwhile prices are unchanged, as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.8¢ for Beams and Channels, Iron or Steel

Merchant Steel.—There is a good demand for all grades, and without change in prices, which are as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2.7¢ @ 2.9¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—The demand is almost exclusively for small lots, for which \$29 @ \$29.50, at mill, is asked. Orders for 500-ton lots and upward might be taken at the inside figure, possibly a shade less for winter delivery, but \$30 is asked for spring deliveries. The feeling is a little conservative on both sides, although the probabilities of lower prices are somewhat remote.

Old Rails.—No change whatever. There are buyers at \$23 @ \$23.50 and sellers at \$23.75, in store, or \$24 for shipments, but no transactions have been closed in this market so far as known.

Scrap Iron.—Good demand for all descriptions, and sales at about the following quotations: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—The demand is less urgent than it was a week ago, but manufacturers have plenty of orders on their books, so that prices are steady and unchanged. Discounts are as follows: Black Butt Welded, 52½ ¢; Galvanized do., 42½ ¢; Black Lap-Welded, 62½ ¢; Galvanized do., 52½ ¢; Boiler Tubes, 60 ¢.

Nails.—The demand is very slow, and prices as irregular as ever. Quotations are supposed to be from \$1.95 to \$2, but there is neither firmness nor uniformity in prices at present.

Pittsburgh.

Office of The Iron Age, 77 Fourth Ave.,
Pittsburgh, October 23, 1888.

The condition of the Iron and Steel industries has undergone no important change during the past week. Some branches of the Iron trade have been in an unsatisfactory condition all this year; the Nail trade has been very poor, and so much are some of our manufacturers dissatisfied with it that they have about concluded to abandon the business and turn their attention to something else which promises a better return. Then there is the Wrought-Iron Pipe trade; the mills have all been busy for several months past, but prices continue irregular and unremunerative, and the same is true of Steel Rails.

Pig Iron.—There has been very little change in the general situation during the past week. Business continues fairly active, while prices remain unchanged. There is not the activity there was a couple of months ago, nor is it to be expected in view of the fact that consumers generally are well stocked, while producers are well sold, so that the one is an offset to the other; many of the former have covered their requirements for the rest of the present year, and many furnacemen have contracts that will fully absorb their entire production during the time in question. It is the opinion of well-informed opera-

tors that there will be but little change in the general position of the market during the remainder of the present year. The consumption continues large, but so is production, and the latter is liable to be increased, as there are still some idle furnaces which can be started up. There is a continued absence of speculation. We quote prices as follows:

Neutral Gray Forge.....	\$16.00 @ \$16.50, cash.
White and Mottled.....	15.00 @ 15.50, "
All Ore Mill.....	16.50 @ 17.00, "
No. 1 Foundry.....	18.00 @ 18.50, "
No. 2 Foundry.....	17.00 @ 17.50, "
No. 1 Charcoal Foundry.....	23.50 @ 24.00, "
No. 2 Charcoal Foundry.....	21.00 @ 22.00, "
Charcoal Mill.....	19.00 @ 20.00, "
Cold Blast Charcoal.....	25.00 @ 26.00, "
Bessemer Iron.....	18.00 @, "

Bessemer Iron is offering more freely, and, with consumers pretty well stocked, the market is weaker. One broker reports having 3000 tons to sell at \$18, cash, but is unable to find a buyer. We can report a sale of Low Phosphorus at \$20, and Low Silicon at \$17.50, both cash; for standard brands of Mill Iron \$16.50, cash, is an outside price.

Muck Bar.—Is still quoted at \$28.50 @ \$29, cash, with a sale of 900 tons reported at \$29.75.

Spiegel.—We can report a sale of 30 % Spiegel at \$33, cash, and of 80 % Ferromanganese at \$56.50, cash.

Manufactured Iron.—Manufacturers report little or no change in the general position of the market during the past week; there is a continued good degree of activity, although orders are mostly small, indicating that buyers are not generally inclined to anticipate future wants. However, the mills are all in operation, and there is a large business in the aggregate, with indications that it will keep up throughout the winter. Prices remain unchanged. Bars, 1.80¢ @ 1.85¢; Plates, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢, all 60 days, 2 % off for cash; Skelp Iron is still quoted at 1.85¢ @ 1.90¢ for Grooved, and 2.10¢ @ 2.12¢ for Sheared.

Nails.—There is no improvement in the Nail trade. Demand continues very light for the season and there is not likely to be any improvement until the spring trade. Prices are unremunerative, although full card rates are being realized. We continue to quote 12d to 40d at \$1.90, 60 days, 2 % off for cash. The Nail trade of Pittsburgh has dwindled down to very small proportions as compared with what it was years ago.

Wrought-Iron Pipe.—While orders are possibly not coming forward so freely, the mills are all pretty fully employed and likely to be this month and November, but prices continue unsatisfactory. The great trouble in this particular branch of the Iron business is a lack of organization and co-operation, and without it it is almost impossible to have satisfactory or uniform prices; for a year past each firm has been making its own prices, independent of each other. Discounts remain about as last quoted, as follows: On Black Butt-Welded Pipe, 52½ ¢; on Galvanized do., 45 ¢; on Black Lap-Welded, 62½ ¢; on Galvanized do., 52½ ¢; Boiler Tubes, 60 ¢ off; 2-inch Tubing, 13¢ per foot net; 5½-inch Casing, 40¢ per foot, net.

Old Rails.—The only sale reported during the week was a lot of 4000 tons American Tees, at \$25, cash, which may be regarded as the ruling price. Consumers generally are pretty well stocked, but the offerings are not large and holders are not pressing the market; they are not apprehensive of any immediate decline and are hopeful that the market may take a turn the other way.

Steel Rails.—There is no improvement in price; heavy sections are still quoted at \$29, cash, on cars at mill in Pittsburgh. (The new mill of the Allegheny County

Bessemer Steel Company will, it is expected, be ready to start up about the 1st of the new year.)

Billets, &c.—Sales Bessemer Steel Billets, at \$29.50, cash, at maker's works, and Nail Slabs, at \$28.75 @ \$29; Rail Ends and Bloom Ends quoted at \$19 @ \$19.50.

Merchant Steel.—There was a meeting of the Bessemer Steel Association the other day, but there was no change made in prices. Best Brands of Tool Steel, 8½¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Open Hearth Steel, 2½¢.

Railway Track Supplies.—Trade continues light, no change in prices. Spikes, 2¢, 30 days, delivered; Splice Bars, 1.80¢ @ 1.85¢; Track Bolts, 2.85¢ with square and 2.95¢ with hexagon Nuts.

Old Material.—There is a fair business at unchanged prices. No. 1 Wrought Scrap, \$21, net ton; Wrought Turnings, \$14.50 @ \$15; Car Axles, \$26 @ \$27; Cast Scrap, \$16 @ \$16.50, gross; Cast Borings, \$12 @ \$13; Car Wheels, \$20; sale short pieces Steel Old Rails, \$18.50, gross.

W. H. Thompson and D. Summers, of Pittsburgh, have formed a copartnership under the style of the Pittsburgh Mineral Company, and will engage in the mining and shipping of the best grades of Manganese, Iron, Zinc, Lead Ores and Minerals. The office of the new company is located at No. 54 Fifth avenue, in the above-named city.

Samuel W. Hay, for a number of years with Howe, Brown & Co., Limited, Steel manufacturers, at Pittsburgh, has recently resigned his position with that firm and has located in the Hamilton Building, where he has commenced a general brokerage business in Metals and Ores. Mr. Hay has also secured the sole agency for the Sharon Steel Casting Company, of Sharon, Pa., and is prepared to quote prices on the manufactures of that firm.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, October 22, 1888.

Pig Iron.—The most prominent feature of the local market for Pig Iron during the past week has been strength. But, while the market has been strong, there has been only a moderate volume of business. The discussion of the tariff and the coming Presidential election fills all branches of the Iron interest and many are the inquiries concerning transactions based upon the outcome. No other interest, apparently, feels so keenly or so closely the questions involved in "protection" and "free trade," and not a few purchases are made upon conviction of the result, yet the general disposition is to be conservative and to make only new contracts to cover orders already placed. Production of Pig Iron is heavy and new furnaces, as well as old ones blowing in, are adding their contribution to the output; at the same time, stocks are reported to be declining, reflecting an almost unprecedented consumption. Information comes by wire from Pittsburgh that an advance in the price of Coke is about to take place, and that the Coke wage-workers will receive some benefit thereby. The recent advance in freight rates has only strengthened the market for Iron. The demand for Southern Car-Wheel Iron has been quite active, and one lot of 6000 tons has been sold at \$25, to be delivered 1000 tons per month for six consecutive months, delivery to begin in January, and 1000 tons No. 2 Southern Foundry has been sold at \$17, and 1000 tons do. at \$16.70, cash. 1000 tons Forge Iron sold at \$15.25, but the majority of the individual sales have been small in

amount. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @	\$17.50
Southern Coke, No. 2.....	16.50 @	17.00
Southern Coke, No. 3.....	15.50 @	16.00
Ohio Soft Stone Coal, No. 1.....	17.00 @	17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @	16.00
Mahoning and Shenango Valley.....	17.50 @	18.50
Hanging Rock Charcoal, No. 1.....	20.50 @	22.50
Hanging Rock Charcoal, No. 2.....	19.50 @	22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @	19.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @	18.00

Forge.

Strong Neutral Coke.....	14.75 @	15.25
Mottled Neutral Coke.....	13.75 @	14.00
Gray Forge.....	14.50 @	14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	25.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @	21.50

Nails.—The market has remained firm, with a moderate volume of business. Jobbing prices are based upon 12d @ 40d, which sell at \$2.10 ¢ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 ¢ keg.

Manufactured Iron.—There has continued to be a fair volume of business, and a firm tone has prevailed for Bar, Sheet, and Structural Iron, with full prices realized: Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3¼¢ @ 4¼¢ ¢ lb.

Old Material.—There has been a better demand for Old Rails and the market has ruled steady, with sales of a few 100-ton lots, at \$23, cash. There has been but little call for Old Wheels, but the offerings have been only moderate and the nominal rates current are \$19 @ \$19.50, spot, cash.

Detroit.

WILLIAM F. JARVIS & Co., under date of October 22, report as follows: More inquiries and for larger amounts have been received during the week than for some time past, and what is more to the point, several orders for round lots of Lake Superior Charcoal have been placed. A large demand for high numbers still continues, and very few furnaces have any quantities of these grades unsold. Consumers are still asking for quotations for next year's delivery, and some furnaces refuse to quote at all, and others that are willing to quote ask from \$1.50 to \$3 per ton advance over present prices. Some Mahoning Valley furnaces are having trouble in shipping No. 1 Iron as fast as called for on old orders and are unable to offer for prompt delivery at any price. There is a great scarcity of cars, and this is a source of annoyance to shippers, as they cannot get cars promptly even when they have the Iron on hand. We report business as satisfactory and the outlook as favoring the furnaces, with quotations as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @	\$20.50
Lake Superior Coke, all ore.....	19.75 @	20.25
Lake Superior Coke, clinder mixed.....	18.50 @	19.00
Standard Ohio Black Band.....	19.75 @	20.25
Southern No. 1.....	17.75 @	18.25
Southern Gray Forge.....	16.25 @	16.75
Southern Silvery.....	17.00 @	17.50
Jackson County (Ohio) Silvery.....	18.50 @	19.00
Old Wheels.....	20.50 @	21.50

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, October 22, 1888.

Pig Iron.—Matters appear to have settled down into a sort of conservative waiting. This may be accounted for, in a measure, on the part of furnacemen, from the fact that there is a demand for all their output, and there appears to be little doubt that this will continue. Speculation seems to have dropped out of sight, for, so far as can be learned, there is not even

an inquiry from this class of customers. There have been term sales made for deliveries to run from January to July of the coming year at present current rates, and it is expected that before the year closes a very large proportion of the output will be so placed. The general opinion appears to be that the result of the election will make but little difference in prices or demand, although there is, of course, some anxiety expressed as to what the policy of the Government will be for the next four years. Freight rates on the lines reaching the Ohio River have been advanced again 20¢ ¢ ton, to take effect November 1, which, with the advance of October 1, of -15¢, makes now 35¢ to all points to the Ohio River and beyond over those of the summer.

Louisville.

LOUISVILLE, KY., October 22, 1888.

Pig Iron.—The market is quiet; prices are fairly held, and many buyers are willing to make purchase of Iron for extended delivery. Furnaces consider the situation satisfactory, and in many instances are accepting orders for future delivery. There have been a few large sales during the week in lots of 500 tons, these, however, at a slight concession in price. Some buyers think that after the Presidential election a decided improvement will take place, while others consider that the market will but hold its own, and that prices will remain at present figures. The demand for Old Rails has fallen off, and the market is decidedly weaker; Old Rails are held at \$23, and Old Wheels at \$21. We quote as follows:

Southern Coke, No. 1 Foundry.....	\$17.00 @	\$18.00
" No. 2.....	16.00 @	16.50
" No. 3.....	15.50 @	16.00
Hanging Rock Coke, No. 1 Foundry.....	17.25 @	17.75
Hanging Rock Charcoal, No. 1 Foundry.....	21.00 @	23.25
Southern Charcoal, No. 1 Foundry.....	18.00 @	18.50
Silver Gray, different grades.....	14.50 @	15.25
Southern Coke, No. 1 Mill, Neutral.....	14.75 @	15.25
" No. 2.....	13.75 @	14.75
" No. 1 "Cold Short.....	14.25 @	14.75
" Charcoal, No. 1 Mill.....	15.75 @	16.50
White and Mottled, different grades.....	13.50 @	13.75
Southern Car-Wheel, standard brands.....	23.00 @	24.00
Southern Car-Wheel, other brands.....	19.25 @	21.25
Hanging Rock, Cold Blast.....	22.25 @	25.25
Hanging Rock, Warm Blast.....	19.25 @	20.25

Cleveland.

CLEVELAND, October 22, 1888.

Iron Ore.—Eastern furnacemen have been in the market during the past week, and have bought liberally of such Ores as can still be obtained. Transportation rates are still surprisingly low for this time of the year, and charters from Escanaba to lower lake ports are made every day at \$1.25 per ton. With correspondingly cheap freights from Marquette, Ashland and Two Harbors, buyers are able to make their concluding purchases at prices quite in keeping with the quotations for Pig Iron. Menominee Ores, non-Bessemer quality, are held a little more firmly, sales at \$4.25 @ \$4.40 being reported, while Bessemer Ores from the same range bring \$5.50 readily, with a few lots of extra quality bringing \$5.80. Red Hematites, non-Bessemer quality, are selling for \$5.15 @ \$5.30, f.o.b. cars, Cleveland and lower lake ports. Lake and all-rail shipments from the upper lake districts closely aggregate 3,450,000 tons, and last season's totals are being rapidly overhauled. The market has a very healthy tone, and there is no indication of weakness anywhere. The mine owners are rushing down the Ore with all possible speed, and all available vessels will be kept busy until forced to tie up for the season.

Pig Iron.—While the demand been fairly active, with a satisfactory number of sales reported, the approaching election is having its effect upon the mar-

ket. The attention of manufacturers as well as of buyers and sellers generally seems to be directed toward the momentous question to be answered on the 6th day of November. Add to this the special interest which Iron men are taking in the result of the election and its relations to their own interests and it is not difficult to account for any existing dullness. While dealers do not anticipate any large orders until the middle of November, every condition of the market seems favorable for a good trade when the entire attention of both buyers and sellers can be given to it. Mahoning and Shenango Valley Mill Irons are in particularly good demand, while No. 1 Foundry is selling freely, buyers seeming to be anxious to increase their stocks before any advance in prices occurs.

Manufactured Iron.—Common Bar at 1.70¢ is in fair demand, while Sheets of every grade are very scarce.

Scrap Iron.—Old American Rails are still held firmly at \$25, with no considerable sales reported. Indications are not wanting, however, of a break, and this will be followed by very vigorous sales of accumulated stocks.

New York.

Office of *The Iron Age*, 65 and 68 Duane street.
New York, October 24, 1888.

American Pig.—The tone of the market has not changed perceptibly, the volume of business being small, though prices remain firm. Consumption is apparently going on at a heavy rate, the majority of furnace companies reporting that their deliveries are very heavy. We continue to quote Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is very quiet, with prices remaining: Coltness, \$21.50, nominally; Shotts, \$20.75 @ \$21; Langloan, \$21, and Dalmellington, \$20.25 @ \$20.50.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Bar Iron.—We quote: Carload lots, half extras, 1.65¢ @ 1.7¢ for Common; 1.7¢ @ 1.8¢ for Medium, and 1.8¢ @ 1.9¢ for Refined, with prices for fancy brands running up to 2.4¢ @ 2.5¢.

Steel Rails.—The only transactions of any magnitude are reported by one Eastern mill, aggregating 30,000 tons, of which 7000 tons are for a Southern road and 23,000 tons for Eastern roads, all 1889 delivery. The market is feverish, with a good deal of quiet work going on and much uncertainty as to the prices which are actually being made at mill both for this year and next. There seems to be little question, however, that low figures have been accepted. We quote \$27.50 @ \$28 at Eastern mill for large quantities, standard sections. There are a number of inquiries in the market, among them some from Eastern trunk lines. One of them for 4,000 tons of 80 pound rails and 6,000 tons of a lighter section is to be placed to-morrow.

Spiegeleisen.—We note sales aggregating about 5000 tons to an Eastern Rail mill at private terms. The market is irregular and difficult to quote. We quote: 80 % Ferromanganese, \$54 @ \$54.50, with a few small sales reported.

Wire Rods.—Some confusion has been created by offerings of foreign Bessemer Rods at \$38.50 @ \$39. Foreign Basic Rods may be quoted \$39 @ \$39.50 for forward delivery. It is reported that the German Wire Rod combination has broken, with little prospect of its renewal for the present.

Old Rails.—We hear of a sale of 600 tons of Foreign Tees at a price equivalent to \$23.50, Jersey City, and of a few smaller lots aggregating a little over 1000 tons, at private terms, to a manufacturer in the West. Negotiations for additional blocks are pending. We quote \$23 @ \$23.50 for Tees.

Metal Market.

Copper.—Spot Chili Bars improved since our last report from £78 to £78. 10/, and futures from £78 to £78. 15/, good merchantable from £77. 10/ to £78. 5/, Best Selected remaining unaltered £82. The following cable was received last week: "A preliminary agreement between the French syndicate controlling the Copper market and the Rio Tinto Copper Company has been signed. It is stated that negotiations have been concluded by which the contracts at present existing between the syndicate and the American companies will be renewed for a term of 12 years." Our own market was apathetic; two December contracts were sold yesterday at 17.70¢, but there were no further buyers. Spot and October are quoted 17.35¢ @ 17.40¢, and Casting brands 16¢ @ 16½¢.

Tin.—The London quotations came slightly better, spot advancing from £102 to £103 and futures from £102. 10/ to £103. 12/6. Total sales for the week, 790 tons. The Billiton sale at Batavia averaged 63 guilders ½ picul. As per cable from Gillilan, Wood & Co., Singapore, to Mr. Charles Nordhaus, East India agent, 89 Water street, New York, the shipments of Tin from the Straits Settlements to this country during the first half of October have been 450 tons, against 50 last year; and to England 700 tons, against 400; since January 1 they were, respectively, 2650 tons, against 4050, and 14,400 tons, against 10,400 tons. Sales in this market were confined to 105 tons at 23.05¢ @ 23.20¢ November, and 23¢ @ 23.05 December, the closing quotation being 23¢ November, and 22.85¢ December, 23.40¢ being asked on the spot, and 23.75¢ for October. The jobbing demand is moderate. **Tin Plates.**—During the past week only a moderate demand has been noticeable, which has been rather a disappointment to dealers, and prices are in some cases again easier. There is not much doing in futures, as the makers are still working on old orders and disinclined to meet buyers' views. The market in Liverpool is not over 13/6 for Coke Tins. We quote at the close to-day, large lines on the spot, Siemens-Martin Steel, Charcoal finish, \$5 @ \$5.75; Coke finish, \$4.70; Terns, \$4.20 @ \$4.35; Bessemer Cokes, \$4.45 @ \$4.50, and Wasters, \$4.25.

Lead.—Soon after our last week's report the failure of Messrs. Nathan Corwith & Co., New York and Chicago, was announced, news which fell on the Lead market like a clap of thunder, inasmuch as it came a great deal sooner than had been expected. That the speculation for a rise the firm was engaged in since the beginning of the year was extra hazardous was the opinion, we believe, of the majority of people in the Metal trade in this city, yet as the firm was considered, if not very rich, at least disposing of large means and credits, it was thought a collapse was not near at hand. But the disappointment felt about the fall trade and the consequent holding

back of consumers as buyers, deprived the speculation of a chance to get out at least square. As matters stand at present it is thought that the total loss of the firm will be found not to exceed \$400,000, and that, perhaps, it may be able to pay 75¢ to 80¢ on the dollar after winding up. It is believed the senior member of the firm will withdraw from the house and the Lead trade. Some estimate the present holdings of the house in store at not exceeding 10,000 tons, while others think it may be 20,000 to 25,000 tons, not counting future contracts with smelters. There is as yet too much confusion and guesswork to arrive at the precise status of the firm's position in its relations to the general Lead situation. There are powerful interests not to let Lead decline in the near future beneath 4¢, money having been advanced on Lead in store by banks and by prominent dealers. The smelters have bought Ores at high figures on their sales to arrive to Corwith. Manufacturers do not hold much beyond present wants, and, though their trade is not brisk, yet at about 4¢ they may be willing to replenish supplies, though but moderately. Sales have been from 4¢ down to 3½¢, and back to 4¢. The closing out of contracts under the rules has contributed about the weakest feature, and, till all are closed out, will continue doing so. Matters may, under the circumstances, remain more or less the same for some time longer. When the market will be left to shift for itself the larger production this year may be felt, and it may be found that the intrinsic value of Lead stands somewhere between 3½¢ and 3¼¢. In the aggregate the sales for the week foot up to 3300 tons at the Exchange alone, 2550 tons thereof being "under the rule" at the figures printed in our usual weekly summary elsewhere, the market closing 3.95¢ bid and 4¢ asked. How long the market will receive support from brokers, dealers and smelters and refiners remains to be seen. This year has been exceptional in the way of light consumption, though not in the way of a heavy output, since the prospect of further additions to the supply next year from the Rocky Mountains is spoken of as strong. Corwith took the surplus this year, which has not gone into consumption. He had contracted for future supplies, which must now seek a market again. The raw material being paid for, consumers will therefore act conservatively, since the outlook is in their favor, unless the demand for manufactured goods should develop in an exceptional manner during the dull season. London gave way all the way to £12. 5/ @ £12. 7/6, but comes to-day £13. 15/ Soft Spanish and £14 English Pig.

Spelter.—At the West Blende Ores remain as high as they ever were in this country—\$30 ½ ton—and some smelters hold at 5½¢ in New York, the current price paid in a moderate way being 5½¢ @ 5¼¢, while Silesian, which recovered to £19 in London, cannot be sold below 6½¢.

Antimony.—There is little Hallett here, while the demand is good at 10½¢. Cookson is strong at 12½¢ @ 13¢. Hallett remains steady in London at £42.

New York Metal Exchange.

The following sales are reported:

THURSDAY, October 18.

10 tons Tin, December.....	23.00¢
64 tons Lead, October.....	4.25¢
32 tons Lead, November.....	4.25¢
16 tons Lead, October.....	4.50¢
16 tons Lead, October.....	4.10¢
16 tons Lead, November.....	4.10¢
16 tons Lead, October.....	4.15¢
50,000 lbs. Lake Copper, January.....	17 15¢

FRIDAY, October 19.

80 tons Tin, November.....	23.15¢
10 tons Tin, November.....	23.20¢
16 tons Lead, December.....	4.00¢
32 tons Lead, December.....	3.95¢
10 tons Lead, December.....	3.90¢

48 tons Lead, spot.....	4.00¢
16 tons Lead, spot.....	3.97½¢
96 tons Lead, spot.....	3.95¢
96 tons Lead, October.....	3.95¢
96 tons Lead, November.....	3.90¢
16 tons Lead, spot.....	3.92½¢
16 tons Lead, spot.....	3.90¢

(Under the rule.)

180 tons Lead, November.....	3.87½¢
100 tons Lead, spot.....	4.02½¢
96 tons Lead, October.....	4.07½¢
100 tons Lead, November.....	4.00¢

SATURDAY, October 20.

(Under the rule.)

100 tons Lead, October.....	4.00¢
100 tons Lead, October.....	3.97½¢

MONDAY, October 22.

(Under the rule.)

82 tons Lead, delivery October 24.....	4.00¢
208 tons Lead, delivery October 25.....	4.02½¢
16 tons Lead, November.....	4.02½¢
80 tons Lead, November.....	4.00¢
96 tons Lead, spot.....	4.00¢
100 tons Lead, October.....	3.87½¢
22 tons Lead, October.....	4.00¢
16 tons Lead, November.....	3.87½¢

TUESDAY, October 23.

16 tons Lead, November.....	4.00¢
32 tons Lead, November.....	3.97½¢
16 tons Lead, November.....	3.95¢
10 tons Tin, December.....	22.85¢
50,000 lb Copper, December.....	17.70¢

(Under the rule.)

410 tons Lead, spot.....	3.90¢
100 tons Lead, spot.....	3.87½¢
210 tons Lead, November.....	3.90¢

WEDNESDAY, October 24

16 tons Lead, spot.....	3.95¢
(Under the rule.)	
55 tons Lead, cash.....	3.95¢
110 tons Lead, cash.....	3.80¢
106 tons Lead, cash.....	3.85¢
110 tons Lead, cash.....	3.90¢
100 tons Lead, October.....	4.00¢
50 tons Lead, October.....	4.05¢

Coal Market.

The Anthracite Coal trade betrays some signs of weakness now that the pressure for early delivery has in a measure subsided, and especially in the face of a continued heavy production at the mines. For some of the domestic sizes alone is there any scarcity, while Broken and the small steam sizes are in excess at lower prices. The most striking feature is the enormous output, the total for the week ending October 20 amounting to no less than 968,540 tons, an aggregate rarely, if ever, surpassed. Compared with the previous week the increase is over 132,000 tons, and compared with the corresponding week last year the increase is 240,000 tons. Since January 1 the aggregate is 30,270,430 tons, against 27,554,975 tons for the same time in 1887. Wyoming alone last week put out 528,800 tons, an increase of over 90,000 tons. Consumers will not fail to notice the tendency to accumulation, and the probable effects of an excessive supply later in the year. Producers, on the other hand, intimate that restriction will be enforced so far as may be deemed necessary.

Quotations are unchanged—viz: Hard White Ash, Lump, \$4.50; Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Free-Burning, f.o.b., Broken, \$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.65; Pea, \$2.75. It is reported that considerable orders have been placed at a cut of 30¢ @ 45¢. Bituminous Coal is being used more generally for manufacturing purposes, and despite the increased production all receipts are quickly absorbed. For the week Cumberland reports 68,000 tons and Clearfield 62,500, while Beech Creek and Pocahontas each send about 30,000 tons. Pool prices are \$3.25, f.o.b.

Vessels are scarce and quoted \$1 to Boston, free of discharge.

It is stated that the Standard Cannel Coal Company, of Tennessee, have secured contracts to furnish for the different gas companies of New York City 20,000 tons of Cannel Coal from the mines at Newcomb. The Lehigh Valley Company will extend their Southern Central Division from Sterling Junction, on the northern border of New York State, to Oswego, one of the best markets of the State.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from October 13 to October 18, inclusive, and from January 1 to October 18, inclusive, were as follows:

Iron and Steel.

	Oct. 13 to Oct. 18.	Jan. 1 to Oct. 18.
	Tons.	Tons.
Pig Iron: Dana & Co.....	500	1,001
James Williamson & Co.....	400	4,900
G. W. Stetson & Co.....	100	13,050
Crocker Bros.....	100	10,197
Spiegelisen: Naylor & Co.....	505	9,833
Crocker Bros.....	109	9,845
Ferromanganese: Naylor & Co.....	100	375
Steel: Oelrichs & Co.....	98	198
R. H. Wolf & Co.....	48	514
A. Milne & Co.....	34	1,108
W. F. Wagner.....	21	1,210
F. S. Hilditch.....	7	464
Steel Rods: Naylor & Co.....	460	16,918
R. F. Downing & Co.....	100	3,424
Cary & Moen.....	26	759
Steel Blooms: Naylor & Co.....	254	2,168
Steel Sheets: Naylor & Co.....	25	515
Steel Billets: J. Abbott & Co.....	113	1,751
Steel Hoops: A. R. Whitney & Co.....	140	2,254
Steel Wire: J. A. Roebing's Sons.....	11	191
Swedish Iron: A. Milne & Co.....	21	359
Rivet Rods: J. Abbott & Co.....	200	4,388
Muller, Schall & Co.....	15	185
Sheet Iron: T. B. Coddington & Co.....	35	1,284
Iron Beams: Post, Martin & Co.....	1½	4½
Charcoal Iron: Page, Newell & Co.....	158	328
A. Milne & Co.....	118	174
Taggers Iron: Phelps, Dodge & Co.....	205	310
Bar Iron: N. Lillenberg & Co.....	200	403
Iron Wire Rods: N. Lillenberg & Co.....	100	590

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	14,594	471,163
N. L. Cort & Co.....	2,513	92,038
T. B. Coddington & Co.....	2,336	140,485
Bruce & Cook.....	1,451	82,597
Jas. Byrne & Son.....	1,399	32,854
Dickerson, Van Dusen & Co.....	1,207	230,008
Merchant & Co.....	847	19,298
G. B. Morewood & Co.....	736	40,681
Pratt Mfg. Co.....	548	142,714
R. Crooks & Co.....	466	58,394
Wolf & Roessing.....	374	51,510
H. Whittemore & Co.....	369	44,679
E. S. Wheeler & Co.....	100	6,808
Taggers Tin: Phelps, Dodge & Co.....	390	390

Metals.

	Pounds.	Pounds.
Tin: Crooke S. & Rfg. Co.....	36,833	219,119
Hendricks Bros.....	22,406	504,590
Lemmer, Sons & Co.....	22,400	88,030
Lead: American Metal Co.....	22,148	22,148
Antimony: Edw. Hill's Sons & Co.....	100	1,350

Hardware, Machinery, &c.

Andreas & Co., Mach'y, cs., 3	
Bernard, Geo., Ironwork, pkgs., 25	
Baker, Hermann & Co., Mdse., cs., 22	
Cutler, J. & Bro., Cutlery cs., 7	
Dolge, Alfred, Mdse., cs., 5	
Folsom, H. & D., Arms, cs., 9	
Field, Alfred & Co., Mdse., cs., 32; Anvils, 20;	
Chains, cs., 2; Hdw., cs., 1; Gun Caps, cs., 10	
G. Laenser, Hdw., cs., 4	
Hartley & Graham, Arms, cs., 22	
Hawley E. Mach'y, cs., 8	
Junge, F. W. & Co., Mdse., cs., 3	
Lau, J. H. & Co., Arms, cs., 25	
Merchants' Despatch Co., Mach'y, cs., 36	
Newton & Shipman, Files, cs., 5	
Pierson, H. R. & Co., Ironware, pkgs., 291	
Pioneer Iron Works, pump, cse., 1	
Pose, —, Mach'y, cse., 1	
Schulte, Wm. & Co., Mdse., cs., 22	
Shoverling, Daly & Gales, Arms, cs., 36	
Sellers, W. B., Mdse., cs., 5	
Ward, Asiline, Mdse., cs., 3	
Wafelaer, Louis, Nails, cs., 87	
Wenz, Ad., Mach'y, cse., 1	
Wiebusch & Hilger, Lim., Mdse., cs., 13; Arms, cs., 3	
Witte, John G. & Bro., Cutlery, cs., 2; Needles, cse., 1	
Order, Mach'y, cs., 2	

Irons and Metals Warehoused from October 13, to October 18, inclusive:

	Tons.
Charcoal Iron: A. Milne & Co.....	10
Lead: Schultz & Ruckgaber.....	901,447

Exports of Metals.

	Oct. 13 to Oct. 18.	Jan. 1 to Oct. 18.
	Pounds.	Pounds.
Copper: J. Abbott & Co.....	17,204	11,361,030
Lewisohn Bros.....	.....	3,629,022
F. A. Lomal.....	.....	2,581,293
American Metal Company.....	164,900	5,794,892
G. H. Nichols.....	.....	223,639
J. Bruce Ismay.....	.....	112,000
S. Mendel.....	.....	560,000

Ledoux & Co.....	110,276
Muller, Schall & Co.....	430,000
Copper Queen Con. M. Company.....	224,064
J. Kennedy, Tod & Co.....	112,026
H. Becker & Co.....	1,250
Orford C. & S. Rfg. Company.....	449,881
Robt. M. Thompson.....	125,000
Thos. J. Pope, Sons & Co.....	25,000 1,451,130
J. Parsons & Co.....	430,000
Naylor & Co.....	448,809
Bridgeport Copper Company.....	112,000
C. Herold.....	250,000
Phelps Bros.....	6,250
R. W. Jones.....	189,984
Ladenburg, Thalmann & Co.....	229,371
W. H. Crossman & Bro.....	4,000
R. Crooks & Co.....	1,000
Copper Matte: Williams & Terhune.....	530,880 35,948,018
Lewisohn Bros.....	3,021,610
American Metal Company.....	141,028 3,255,666
J. Abbott & Co.....	295,009
C. Ledoux & Co.....	454,000 638,509
F. W. J. Hurst.....	184,288
G. H. Nichols.....	729,777
H. T. Nichols & Co.....	180,996
Kunhardt & Co.....	41,652

Financial.

While there is noticed no special activity in business circles, accounts are generally favorable as respects local trade, dry goods jobbers, grocery men and others reporting a tendency to improvement. There is more than usual desire to take advantage of low freights prior to the close of navigation, and in the Southern trade there is a decided increase, stimulated by the gradual disappearance of yellow fever. The approximation of the wheat market to normal prices is also a favorable omen. Under present conditions grain exports are practically suspended, excepting from the Pacific coast. Trading in wheat is slow, but speculation is encouraged by easier money. Spot cotton is dull and about steady. High rates at Southern ports operate to retard shipments. Chicago advices are that "the general mercantile trade is moving along fairly well, present prospects seeming to indicate that it will be protracted over a longer period than was anticipated earlier in the season. The unsettled state of the grain markets and the lateness of the corn crop is delaying collections more or less in some sections of the country. This, together with the shortage in the wheat crop, tends to retard buying to some extent." A notable feature of the times is the shortage of rolling stock on the principal railway lines. "On Saturday last," says the *Cleveland Plaindealer*, "the Nickel Plate was 3000 cars short, the Bee Line 1700 and the Lake Shore and other roads in the same condition. The pressure from the East seems to be lessening." A Pennsylvania railway official is reported as saying that it is almost impossible to place any new orders for locomotives at the present time, all the works being full, and the railroads of the country everywhere want more cars. Largely increased earnings are looked for when once the corn crop is fairly in motion. The gross earnings of 73 railroads for the first week of October show an increase of \$81,648, or 1.17%. The Chesapeake and Ohio Railroad has given orders to double its freight equipment, proposing to build up a great export business at Newport News by shading export rates.

The dullness of the Stock Exchange was relieved on Monday by the supposed consummation of the project long pending for the consolidation of important lines of Southern railways. The parties to the transaction are the Georgia Company, controlling the Central Railroad and Banking Company of Georgia and the Richmond and West Point Terminal Railway Company. President Inman, of the Terminal Company, says: "We have bought the Georgia Company's property. The details as to terms are not yet definitely settled, but it can be positively stated that the deal will go through. We obtain control through the purchase for cash of \$12,000,000 of the Georgia Com

pany's stock, for which \$4,200,000 is to be paid. The purchase will bind together under a single management all the railroad properties in that section of the South penetrated by the Terminal and the Central systems, the union being made more important by the leases of the East Tennessee, Virginia and Georgia, the Georgia Pacific and the Knoxville and Ohio railroads, which have been closed by the Terminal or its controlled companies. Our line of steamers from Savannah to New York will be established, which will give the consolidated system control of every important port in its territory." Large sales of Union Pacific were a feature of the week, this stock advancing on the improved financial statement of President Adams. The failure of Corwith & Co., of pig-lead fame, had an unfavorable influence. Chief among the depressing influences of the week was the unsatisfactory condition of Atchison, Topeka and Santa Fé affairs. On Saturday the bank statement stimulated a rise and the market closed buoyant. On Monday all securities represented in the Richmond Terminal advanced. Stocks were irregular on Tuesday, Richmond Terminal rising on news of the absorption of the Georgia Central system. The movement was less active in the afternoon, but the tone was strong, with Reading, Union Pacific and the grangers leading.

Government bonds were firm and in good demand—quotations as follows:

U. S. 4½s, 1891, registered.....	108¼
U. S. 4½s, 1891, coupon.....	108¼
U. S. 4s, 1907, registered.....	127½
U. S. 4s, 1907, coupon.....	127½
U. S. currency 6s.....	121¼

Commissioner Fink, of the trunk lines, has issued a circular announcing a decided advance in the west-bound rail and lake freight rates from New York to the West. The new rates from New York will go into effect on October 26. The present rates are 35¢ for first-class, and 30, 24, 17, 15 and 13¢ for the other classes downward. The new tariff advances these figures to 51¢ for first-class, and 45, 35, 24, 20 and 17¢ per 100 lb from New York to Chicago for the other classes.

The aggregate clearings of 38 cities during the week show a falling off of 2.8% as compared with the corresponding period last year; outside of New York, however, there was a gain of 12.1%; New York decreased 10.1%; Cincinnati, 5.7%; New Orleans, 0.7%; St. Paul, 15%; Columbus, 6.4%; Wichita, 16.5%; Norfolk, 8.1%; and St. Joseph, 21.1%. Boston increased 19.4%; Philadelphia, 6.9%; Chicago, 9.4%; St. Louis, 8.4%; San Francisco, 41.2%; Pittsburgh, 25.7%; Kansas City, 36.4%; Louisville, 11.8%; Minneapolis, 16.7%; Denver, 16.2%; Detroit, 17.3%; Cleveland, 15.2%.

The weekly bank statement was remarkable as showing an increase of \$6,586,000 in the surplus reserve, which now stands at \$16,901,025, against \$9,363,225 at the corresponding time last year and \$5,469,575 in the third week in October, 1886. The explanation is that the heavy bond purchases by the Treasury last week appear on this week's statement. The ability of the banks to meet any further demands that may be made upon them this autumn is not now questioned. Loans were contracted \$3,189,600; the specie increased \$9,231,300; the legal tenders are down \$791,200; the deposits other than United States are increased \$7,414,500. Demands from the South for crop purposes continue, while from the West some return shipments are noticed. Rates on time loans, most of which were made by out-of-town institutions, were 3½ to 4½ for three to six months for commercial paper, and rates were 4½ % to 5½ % for 60 to 90 days, 5 to 6 % for first class four months' commission house names.

The last Treasury statement shows that

up to date the Government has purchased under the circular of April 17, \$87,454,050 bonds, of which \$51,892,000 were 4s and \$36,062,050 were 4½s. These \$87,454,050 cost \$104,905,644. Had they been allowed to run to maturity they would have cost \$131,199,036. By their purchase now, even at a premium of \$2,838,064 for the 4½s, and \$14,613,539 for the 4s, the Government saves on the former \$1,850,002; on the 4s, \$24,443,138, or a total of \$26,293,392.

The posted rates for bankers' sterling are \$4.84½ @ \$4.85 for 60-day and \$4.88½ @ \$4.89 for sight. The market is dull and firm. In London the withdrawals of gold are temporarily checked, but Argentine and Russian demands are simply in abeyance, to be renewed at the first opportunity.

The imports of merchandise at this port last week were valued at \$8,634,000, of which something over \$2,000,000 represents dry goods. Since January 1 the total is \$377,640,000, against \$380,998,000 for the corresponding period last year and \$353,718,000 in 1886. The exports were \$5,903,091. Total since Jan. 1, \$237,697,000 against \$250,442,000 for the same time last year, and \$261,830,000 in 1886. The Empire State Bank, corner of Broadway and Bleeker street, James W. Conrow, president, will soon open for business.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Oct. 24, 1888.

Speculation in Copper has been very moderate the past week. The selling of futures has dwindled down to small proportions, and the demand for prompts from outside sources is necessarily small. Purchases for consumption have also continued light. In the absence of incentive the syndicate is doing nothing in a speculative way, apart from giving values a certain measure of support. Consumers, it is stated, are no longer bound by cast-iron agreement in making purchases. That is to say, they are now supplied with what Chili Bars they may require, at £78 @ £78. 5/, without giving a guarantee that the Copper will go into consumption. Sales of Copper Furnace Material have again been on a quite extensive scale, but the sellers are more than ordinarily reticent as to terms. Among recent sales Anaconda Matte figures to the extent of 1600 tons, and some 300 tons of American are also reported—all private terms. It is reported that the Rio Tinto Copper Company have signed a new agreement with the French syndicate, giving the latter the control of the company's product for a period of years. The report also has circulation that the negotiations pending with the leading American companies, involving the control of their output for twelve years from the expiration of existing contracts, have been concluded. No particulars are given as to terms, &c. The Bratsberg Company has sold their entire production up to June, 1889, at 13/ per unit.

The market for Block Tin has been very firm, mainly under the influence of continued active buying at the sources of supply. The stock here is still comparatively small and said to be concentrated in few hands.

In the Tin-Plate market there has been a very good business. Buyers and sellers

are considerably apart on prices, however, and transactions are restricted to a considerable extent. A large trade is anticipated as soon as prices settle. The Cwmfelin works have added two mills, and now have a total of twelve mills in operation. New mills are being erected by other companies. The wages question is creating more or less uneasiness, and it is stated that the makers are soon to hold a meeting in the interest of concerted action. The masters, it is asserted, have virtually agreed to combine, if their propositions are not accepted, and instantly close down all their works.

The Pig Iron market has been more active, and a variety of influences have come to the surface that tend to strengthen prices more or less. A scarcity of Coal has necessitated the banking up of several Scotch furnaces and thereby reduced the supply. There are also reports of a contemplated combination of Scotch and Cleveland pig makers, presumably to regulate the production. Regarding this alleged combination, nothing definite can be learned at the present time. Scotch Pigs have varied in price only to a very slight degree. Cleveland Pig has weakened a trifle, however, and Hematites, on the other hand, are higher. Freights are showing an easier tendency, more particularly from Glasgow.

Scotch Pig.—The volume of business has been fairly good and prices have ruled very steady.

No. 1 Coltness, f.o.b. Glasgow.....	49/6
No. 1 Summerlee, ".....	50/2
No. 1 Gartsherrie, ".....	47/6
No. 1 Langloan, ".....	48/
No. 1 Cambro, ".....	43/
No. 1 Shotts, " at Leith.....	48/6
No. 1 Glegarnock, " Ardrossan.....	47/6
No. 1 Dalmellington, ".....	42/6
No. 1 Exlinton, ".....	41/6
Steamer freights, Glasgow to New York, 6/6	
Liverpool to New York, 10/.	

Cleveland Pig.—Business has been rather slow and the market is weaker. No. 1 Middlesboro', G.M.B., 37/; No. 3 do., 34/6.

Bessemer Pig.—Trade is showing* greater spirit and prices are firmer. West Coast brands, mixed numbers, 45/, f.o.b. shipping point.

Spiegeleisen.—The demand continues very fair and prices remain firm. English .20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—There has been a large business and prices show further improvement. Standard English sections quoted at £4, f.o.b. at N. W. England shipping point.

Steel Blooms.—Transactions are moderate, but prices remain firm. We quote £4. 2/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—There continues to be good demand and prices are very firm. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Transactions in these are moderate, but mainly at firm prices. Bessemer, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—The demand moderate, but sellers firm at previous prices. Mild Steel No. 6 quoted at £5. 19/6 @ £6 and No. 5 at £5. 18/6, f.o.b. at N. W. England shipping point.

Scrap Iron.—A moderate business at previous prices. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Old Rails.—Demand very slow; rather more pressure to sell, and prices weaker. Tees quoted at £3. 2/6, and Double Heads £3. 5/, c.i.f. New York.

Crop Ends.—The market quiet and unchanged. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—A fair business passing, but prices somewhat irregular. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/3 @ 15/9
IC Bessemer steel, Coke finish.....	14/3 @ 14/6
IC Siemens.....	14/6 @ 14/9
IC Coke, B. V. grade.....	13/9 @ 14/
Charcoal Terne, Dean grade.....	12/ @ 12/6

Manufactured Iron.—The market still fairly active, with prices strong. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars.....	£ s. d. @ 8 2 6
" Common.....	@ 5 5 0
Staff. Bl'k Sheet, singles.....	@ 7 10 0
Welsh Bars (f.o.b. Wales)....	4 17 6 @ 5 0 0

Tin.—There has been a good business, and the market is strong, particularly for futures. Straits quoted at £102. 10/, spot, and £103 10/ for three months' futures.

Copper.—There is more doing at practically unchanged prices. Chili Bars, £78. 10/, spot, and £78, three months' futures. Best Selected, £81. 10/.

Lead.—The market declined under weight of American advices, but is now firmer. Soft Spanish, £13. 10/.

Spelter.—More business and the market hardening. Silesian, ordinary, £18. 17/6.

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira.....	Cents. 19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Milreis (Portugal).....	61.08
Milreis (Brazil).....	54.5
Mark (Germany).....	23.8
Kilogram.....	Pounds. 2.205
Picul.....	134.

CHILI.

VALPARAISO, September, 1888.—**Copper.**—Has been offered sparingly, yet receded slightly in consequence of the rise in Exchange, from \$29.80 $\frac{1}{2}$ quintal to \$29.65, 8273 quintals changing hands at \$29.65 @ \$29.80, \$29.75 equaling \$77. 1/9, with 27/6 freight. **Nitrate.**—Some 406,000 quintals were taken at \$2.80 @ \$2.86, 95 %, October delivery, but none is offered now; 96 % is held at \$2.87 $\frac{1}{2}$; \$2.80 equals 8/9 in England, with 30/ freight. Nitrate shipments the first seven months:

	1888.	1887.	1886.
Quintals. Quintals.			
To the North of Europe.....	5,756,759	4,864,983	3,089,637
To the Mediterranean.....	103,334	182,938	92,312
To the United States on the Atlantic.....	899,398	1,001,709	1,087,314
To the United States on the Pacific.....	113,438	142,206	118,069
Total.....	6,872,929	6,191,926	4,387,332

Coal.—Quite a tumble has taken place under pressing offers to sell cargoes just arrived, Newcastle declining to 28/ @ 30/ on the spot, and 35/ distant floats. Exchange, 90 days' sight, 26 $\frac{1}{2}$ d.—Weber & Co.

EAST INDIES.

SINGAPORE, September 5, 1888.—**Tin.**—Our last report was dated 23d ult.; prices have fluctuated since between \$34.50 and \$37.70, and a fair business has been done. Supplies are now arriving freely. **Tonnage.**—London rates via Canal are firmer at 30/ @ 32/6 for weight. New York via Canal, no space offering. Via Cape, the Gillemester has taken the berth at 25/ for weight. For Boston the John M. Clerk has been taken up on secret terms. Exchange is firm at 3/1 $\frac{1}{2}$ for six months' sight credits.—Giffman, Wood & Co.

MANILA, October 15, 1888.—**Hemp.**—Has been steady during the week at \$11.12 $\frac{1}{2}$, @ \$10.25 same time last year, $\frac{1}{2}$ picul,

equaling cost and freight $\frac{1}{2}$ ton, £37. 15/, @ £35. 17/6. There cleared for the United States since last cable 11,000 bales, against 7000; since January 1 163,000, against 178,000, and there remain loading 51,000, against 49,000; cleared for England since January 1 288,000 bales, against 175,000 last year; loading for ditto, 11,000, against 4000; cleared for all other countries, 59,000, against 33,000; receipts at all ports since last cable, 24,000, against 13,000, and since January 1, 506,000, against 404,000 in 1887, and 322,000 in 1886. Freight, \$6, against \$5.50; Exchange, 3/8 $\frac{1}{2}$, against 3/8.—Ker & Co. to Charles Nordhaus, 89 Water street, New York.

SPAIN.

BILBAO, October 6, 1888.—**Iron Ore.**—So far this year the export of Iron Ore from our port has decreased considerably, from 3,422,966 tons to 2,901,544; as at the same time freights by sea had risen very much, it would have been but logical that the price of our Ore should decline. Nothing of the kind has occurred, the fact being that the quality of our Ore is so valuable that neither a lull in the foreign demand nor high freights nor speculation have been able to depress their value. From now forward the scarcity of steamers will terminate; navigation in northern ports will close and many steamers will flock this way, as they usually do in winter, to load Iron ore at Bilbao, being the most profitable occupation in default of something better in other directions, which does not offer at present. What we have said refers to Rubios in particular, worth to-day 7/ @ 7/3. Campanil Ores are even better situated, and their position is stronger from the fact that there are but comparatively few mining companies owning mines producing Campanil Ores, and that this sort enjoys a special demand for Steel making of a superior kind. While there is every probability that Rubios Ore will rise in value with the resumption of greater activity in shipments, the chances are even greater in this respect as regards Campanil, now commanding 8/ @ 8/3. As for steam freights, they have declined a little in the Baltic, but they are higher in the Black Sea ports, where there is a good demand for steamers to load grain and tallow for England at 35/ @ 37/6 $\frac{1}{2}$ ton and to Bordeaux at 26/. Ore freights hence to Cardiff are 6/1 $\frac{1}{2}$ @ 6/3, and to Rotterdam, 8/ @ 8/3 $\frac{1}{2}$ ton; Pig Iron from Bilbao to Ancona in Italy, 15 francs $\frac{1}{2}$ ton.—Bilbao *Marítimo y Comercial*.

GERMANY.

HAMBURG, October 11, 1888.—**Petroleum.**—The tank steamers between the United States and Germany are causing a complete and most important transformation of the Petroleum trade. It was inaugurated by the firm of Riedemann at Geestemünde, near Bremerhafen, in 1885. Till 1885 the whole of Europe was in the habit of importing Petroleum in barrels from America only by sailing vessels, and the empty barrels were shipped back. In 1885 the firm of Riedemann caused one of their sailing vessels to be rebuilt, so as to be a "tank" ship, 72 Iron Tanks being fixed in the hold, filling the same, a cleverly contrived system of pipes connecting them mutually. Into these tanks the Standard Oil Company's Petroleum was pumped, and upon arrival at Geestemünde the contents were transferred to large reservoirs capable of holding 10,000 barrels. Riedemann thereupon caused the steamer Gluckauf to be constructed, the entire hold of which was a tank. Subsequently four additional steamers were built, the Vorwärts, Minister Maybach, Willkommen and Gut Heil. These five steamers have since been conveying annually 120,000 tons of Petroleum of 1000 kg. from the United States to Geestemünde, representing something like 830,000 barrels. The firm now own 15 large Petroleum reservoirs at Geestemünde. Part of the Petroleum is transferred to tank cars, of which the firm own 100, and besides quite a number of German and Swiss Petroleum dealers have caused to be built tank cars of their own, and the firm of Has, at Cassel, have a large reservoir. This trade has grown so much the last few years that at present nine-tenths of Bremen's entire Petroleum importation is received in tank ships, of which one-third goes direct into tank cars; the balance is filled into barrels at Geestemünde. In this item of filling barrels with Petroleum Riedemann also introduced innovations on a gigantic scale. At present he has a stock of empty barrels worth 1,265,000 marks; every day 4000 barrels are turned out. They have a bluish-white color, are lined with glue inside to resist Petroleum, and are filled by an automatic contrivance. The saving in space on board the steamers is such that a tank steamer takes 20,000 to 24,000 barrels of oil in bulk, whereas in barrels only 14,000 could be loaded. The loading of 24,000 barrels takes 60 hours, and the discharging 30 hours. While the leakage on the voyage is 3 to 4 % in barrels, there is none on board tank steamers.—Borsenhalle.

Weights of Engines and Boilers per Horse-Power.—In a paper entitled "The First Century of the Marine Engine," presented to the British Institution of Naval Architects, Prof. Henry Dyer refers to the reductions which have been made in recent years in the weights of engines and boilers, and supplies the following interesting table:

	Lbs. per I. H.-P.
Merchant steamers.....	490
Royal navy.....	860
Engines specially designed for light draft vessels.....	280
Modern locomotive.....	140
Torpedo vessels.....	60
Ordinary marine boilers, including water.....	196
Locomotive boilers, including water.....	60

No doubt these figures could be very much reduced if engineers endeavored to make their designs as light as possible; but here the commercial element limits their action, for light engines are always expensive, their high-class workmanship and costly material more than balancing the advantages to be derived from reduced weight.

From the Marquette (Mich.) *Mining Journal*, of the 13th inst., we take the following table, showing the shipments by ports up to date this season, in comparison with shipments for the corresponding portion of the two preceding years:

Port	1888.	1887.	1886.
Marquette.....	669,477	697,025	725,942
Escanaba.....	1,699,611	1,741,042	1,250,717
St. Ignace.....	97,090	80,654	62,595
Ashland, Wis..	880,268	930,316	612,968
Two Harbors, Minn.....	327,439	330,464	264,584
Total.....	3,673,885	3,779,501	2,916,581

The new port of Yaquina, in Oregon, where a breakwater and other improvements are making by the general Government, is represented as being the finest harbor on the Pacific Coast north of San Francisco. Portland is 110 miles from the ocean and Tacoma and Seattle, the ports of shipment of the Northern Pacific Railroad, have to traverse Puget Sound and the Straits about 180 miles before the ship arrives at the ocean, while it takes only a few minutes to cross the bar at the mouth of Yaquina Bay, when the ocean is reached and the ship is at sea. The appropriation made by Congress this year, it is said, will render this great harbor safe at all seasons, as the water on the bar at low tide at the present time is almost sufficient for vessels of the largest size. Arrangements are now in contemplation for the shipment of grain direct to Europe by the Oregon Pacific Railroad from Yaquina Bay, and the future is so promising that already a large population is concentrated at that locality.

The new armory for the Eighth Regiment, N. G. S. N. Y., about to be erected, will be one of the most artistic and imposing structures of its kind in the city. It will cover a plot of ground on Park avenue 200 x 300 feet, and at each corner will stand a spacious round tower of the baronial style, 50 feet in diameter and 135 feet in height. The material used is brick, with sandstone trimmings. The main drill-room, 200 feet square, will be on the first floor, together with a large reception-room, a library and the quarters of the officers and the Quartermaster's Department. The ten company-rooms will be on the second floor, and the third will be devoted to a gymnasium, a kitchen and the janitor's apartments. Under the main drill-room will be a 200-foot rifle range. The building will probably be completed by next September. The estimated cost of ground and structure is \$660,000. The cornerstone was laid 19th inst. with imposing ceremonies.

Hardware.

As the end of the month approaches there is perhaps a slight falling off in the volume of business, but the general conditions continue as before, with a satisfactory trade and prices that are substantially unchanged. The prospect for a good business during the remainder of the season is generally acknowledged.

Barb Wire.

The demand continues rather moderate and prices have not strengthened, remaining about where they have been. Carload lots of Four-Point Galvanized are quoted at about 3.60 cents, with slight concessions in special cases, and the usual advances for small lots.

Cut Nails.

The New York market remains quiet, without any recovery as yet from the low figures which have prevailed so long. We quote \$1.80 to \$1.90 for carload lots of Iron Nails from dock, and \$1.90 to \$2 for small lots from store.

It is reported that some Western makers are naming low figures throughout the territory tributary to this market, and in the East generally, with the object of forcing some understanding among manufacturers by a short, sharp and decisive war.

The unsatisfactory condition of the Western Cut Nail trade has caused one of the largest Nail companies in the country to shut down more than half of their Nail machines, for the first time in their history. They expect to keep them idle throughout the winter. A continuation of present unremunerative prices will probably cause a very decided curtailment in production by other companies, without regard to the action of their competitors in trade.

The Laughlin Nail Company call the attention of the trade to their 3d fine Polished Nails. They are made from plate that has not been pickled, and consequently will not make lathers' mouths sore.

Miscellaneous Prices.

The following are the list prices of McGuire's Star Thimbles, Registers and Ceiling and Register Plates, manufactured by E. C. Stearns & Co., Syracuse, N. Y. The list as given is subject to a discount of 60 per cent.:

McGuire's Star Thimble.

5-inch, 4 to 8 inch extension, per dozen.	\$10.00
5-inch, 6 to 12 " " " "	11.00
6-inch, 4 to 8 " " " "	11.00
6-inch, 6 to 12 " " " "	12.00
7-inch, 4 to 8 " " " "	13.00
7-inch, 6 to 12 " " " "	14.00

McGuire's Star Register.

6-inch, 4 to 8 inch extension, per dozen.	\$22.75
6-inch, 6 to 12 " " " "	23.75
7-inch, 4 to 8 " " " "	25.75
7-inch, 6 to 12 " " " "	26.75

Ceiling Plate.

5-inch, per dozen Plates.	\$2.35
6-inch, " " " "	2.75
7-inch, " " " "	3.25

Register Plate.

6-inch, per dozen Plates.	\$9.00
7-inch, " " " "	9.50

We are advised by the New Haven Copper Company, New Haven, Conn., for whom John H. Graham & Co., are agents, 113 Chambers street, New York, that they are holding their Augers and Bits at higher prices than heretofore, and are giving special attention to the quality of the goods, upon which they are relying to secure the orders of the trade.

From St. Louis our advices are that there is considerable improvement to be noted in the Wire trade, country orders coming in more freely and mills being

gradually worked up to their capacity. The demand for the cheaper grades of Wire is not, however, at the present time very large. The Freeman Wire Company, St. Louis, quote as follows:

Barb, Two and Four Point, Painted,	\$2.95 to \$3.10
Barb, Two and Four Point, Galvanized,	60 to 75 cents advance.
Nos. 6 to 9, Annealed.	2.35 to 2.40
Nos. 10 to 11, " "	2.45 to 2.50
No. 12, " "	2.55 to 2.60
No. 13, " "	2.70 to 2.75
Galvanized, 60 cents advance.	
No. 14	2.85 to 2.90
No. 15	3.15 to 3.20
No. 16	3.25 to 3.30
Galvanized, 75 cents advance.	

The Solitaire Coffee Urn, manufactured by the Chas. F. Henis Company, Philadelphia, Pa., for whom Samuel A. Haines, 90 Chambers street, New York, is agent, is quoted to the general trade at \$2.50 per dozen.

Owing to the present condition of the Lead market Solder is unsettled, and there is some diversity in the quotations made by leading manufacturers, No. 1 being quoted at from 12 to 13 cents, and Half-and-Half from 13½ to 14½ cents. The market is characterized by a rather weak tone.

The trade will observe the illustrations, given on page 646, of the Arcade Revolving Bench Plate, which is patented and put on the market by Frank E. Thompson, Elkhart, Ind. The utility of this device for holding Tinners' and Metal-Workers' Tools, Stakes, &c., will be at once perceived. A circular is issued by Mr. Thompson in which a full description is given of the article, and among other points which are mentioned is that twice the number of men can work at a bench with such a Bench Plate than at one without it. The Bench Plate is sold at \$2.50, f.o.b. cars Elkhart, no charge for box or cartage. Its shipping weight is 40 pounds.

The following quotations are made by the Nickel Plate Stove Polish Company, Chicago, Ill.:

Black Eagle Benzine Paste, 5 and 10 lb. cans.	12¼¢
Black Jack Water Paste, 5 and 10 lb. cans.	12½¢
Nickel Plate Paste, ¼ and ½ gross boxes,	
per gross	\$4.00

In Machine Bolts, in which there has of late been a good deal of irregularity, a somewhat better condition is said to prevail, prices being a little stiffer.

The combination on Common Carriage Bolts continues to work quite satisfactorily, but there are some indications of slight irregularities, in which, in a covert way, some of its provisions are evaded.

The market on Steel Goods is in a very satisfactory condition, and orders are being freely placed by the jobbers. The confidence that exists in the stability of the arrangement, and the fact that stocks were very much depleted at the close of the last season, have the result of making these orders liberal, covering large quantities.

The Screw market continues without change, and the combination prices are well maintained by the associated manufacturers. The Charles Parker Company, who are outside, are making small concessions in price.

No change in Manila Rope has yet been announced, but the condition of the market is such as to give reason to expect that an advance may be made before long. Sisal also is reported as decidedly firm.

As a consequence of the condition of the Lead market, Shot, Sheet Lead, &c., are in an unsettled state, and prices lately ruling are nominal.

E. M. Richardson, Waltham, Mass., is now putting up Shedd's Fast in paper

boxes containing 10 sets, with 100 to 500 sets in a case. No change has been made in the price.

Trade Topics.

From California we have received the following complaint in regard to Plumbs and Levels. It is to be hoped that the experience to which our correspondent refers is exceptional and does not indicate the general quality of the goods in question:

If you have any room in your valuable paper you will confer a favor on the trade generally by drawing the attention of manufacturers of Levels to an injustice they do retail dealers by sending out goods that are not correct. A few days ago a buyer came in to purchase a Level. We showed him samples and he chose one which we sell for \$3.25. Of course when a man pays that price he wants to see if it is accurate, and on going over 18 of this quality we did not find one that was correct as a Level, to say nothing of the Plumb, and, of course, we did not make a sale. The next day we started one of the clerks to go over the whole stock, and in 117 Levels we found the following result:

Correct in Level and Plumb.	0
Plumbs correct.	7
Levels correct.	3

We tried Levels that cost from \$4 to \$30 per dozen. We think manufacturers ought to be able to make the tools correct, and no doubt they would if a few retailers would kick.

A few manufacturers are issuing both net prices and quotations by list and discount. We are advised by one of these, a well-known manufacturing concern of the West, that some merchants prefer net prices on account of the convenience in not having to figure the discount, thus saving work in marking goods. Most of the trade, especially among the larger buyers, prefer the list and discount, as this method is much simpler and easier in purchasing the goods.

Items.

The Goulds Mfg. Company, Seneca Falls, N. Y., and 60 Barclay street, New York, have issued a new catalogue of their varied line of Pumps, Engines, Rams and Hydraulic Machinery. It is a volume of nearly 300 pages, compactly arranged, fully illustrated, and of unique typographical design. The front cover is represented in miniature in their advertisement on page 36. An interesting feature of the book, the utility of which will be appreciated by intending purchasers, is the many excellent illustrations of their goods in operation. An interesting department of the book is that devoted to a description of the manufacturing of their goods, and many illustrations are given representing the different departments of their factory and the various stages in the production of the goods. In addition to their line, with which the trade is familiar, a number of new goods are represented.

The F. B. Harkins Foundry Company, Bristol, Conn., manufacturers of a line of Cooking Ranges of several sizes, are also making a line of Stove Hollow-Ware and fine Gray Iron Castings, which are referred to as excelling in their smoothness of finish, special reference being made to their Unground Spiders. Mr. Harkins, the president of the company, has invented and secured patents upon a Molding Machine which may be used for the production of small work of various kinds, but is especially adapted for use in making Sash Weights. The Weights are referred to as in regularity and smoothness of surface superior to others in the market, and are sold at about the same price.

H. H. & C. L. Munger, manufacturers' agents for Hardware specialties, at 142 Lake street, Chicago, have been appointed Western agents for the Brinkhoff Company's Crown Picture-Hanger, which was illustrated in our columns on the 4th inst. They will carry a full stock, so as to be

able to make prompt shipments. They have also recently received samples of Lawson's Patent Revolving Shelf Showcase, for which they are sales agents. A new addition to their stock is a line of the Phoenix Bench Anvils, made by the Moore & Barnes Mfg. Company, for amateurs, jewelers, &c. They state that they are again well supplied with the Patent Fiber Head Mallets, the manufacture of which had been curtailed by the burning of the factory. These mallets have vulcanized fiber heads, pressed on under 200 tons pressure, which have been found equal to leather heads for mechanical purposes, and superior to them in durability.

It will be observed on page 59 that the E. C. Meacham Arms Company, St. Louis, Mo., call attention to some new Guns, somewhat shopworn, which they are offering at special prices.

The Hartman Mfg. Company, Beaver Falls, Pa., have established a Western sales agency in the First National Bank Building, Chicago, under charge of S. T. Hastie, for the sale of their Steel Picket Fence. They make both ornamental fences for lawns and field fences for farm purposes. It is not a netting, but a substantial fence.

A. G. Newman, successor to Newman & Capron, 1180 Broadway, with factory at 157 to 163 West Twenty-ninth street, New York, has issued a very fine illustrated catalogue of Builders' Hardware, including Locks, Knobs, Sash Fasteners, Handles, Bolts, Hooks, Hinges, Sheaves, Electric Bell Material, &c., all of which are represented in an attractive style, many tasty patterns being displayed. In their introductory address to their patrons they refer to the fact that the standard of artistic Hardware has been raised by the efforts of the architect and persons of taste, who have demanded of the Hardware manufacturer that the articles produced shall be in the highest style of the art, and it is to meet the demand for goods of this kind that the line represented in the catalogue is offered. The styles of finish applied to the goods shown in the volume are polished, light bronzed, light statuary, statuary or dark bronze, verde-antique, oxidized silver and gold-plated. This volume will be of especial value to architects and builders, for whom it is particularly designed.

The Freeport Hardware Mfg. Company, of Freeport, Ill., moved into their new office and warehouse last week. When the improvements now under way are completed they will occupy a space 88 by 150 feet. About half of this tract is now covered with a frame building, which is three stories high in front and two stories in the rear, running back to the railroad tracks for the purpose of securing good shipping facilities. The front part of the remainder of the tract is covered with the office building, and the rear will soon be occupied by another building which is under construction. The company manufacture a line of Hardware specialties, embracing the Wiles Spring Hinge, the Devore Spring Hinge, the Imperial Spring Hinge, the Warner Spring Hinge, Devore's Door Spring, Devore's Indestructible Awl, Linsley's Hobson's Choice Screw-Driver, the Wonder Cork Extractor, and Linsley's Box Opener or Nail Puller. They do not operate a foundry, but have their castings made by other establishments, and employ a force of workmen to put the various parts together. They have issued a neat catalogue of their specialties, illustrating and describing them, and setting forth their special merits.

The Eastern Tinware Company, Portland, Conn., announce that they have purchased the plant of the United States Stamping Company, at Portland, Conn., where they will continue the manufacture

of the goods. They have given Joseph Scheider & Co., 103 to 109 North Third street, Brooklyn, E. D., N. Y., the exclusive agency for their entire production. Referring to the above Joseph Scheider & Co. allude to the extensive line of goods which they manufacture in Brooklyn, together with the production of the Eastern Tinware Company, as enabling them to supply the trade with a full line of Tinware.

Seymour Mfg. Company, St. Louis, Mo., have issued a tasty catalogue of their Grain Cradles, Scythe Snaths and Spokes, 1888-89. The pamphlet is printed on superior paper and excellent illustrations are given of the different goods.

A sale of Hardware, on account of fire underwriters, takes place on the 24th inst. at 200 to 206 Madison street, Chicago. The goods are the salvage of Cutler, Woodrough & Co., 19 Lake street, and consist of 600 cases of Lock, Knobs, Latches, Casters, &c., and 200 cases of the Pioneer Lock Company's Hinges, Pins, Joints, Flat Irons, &c. They were slightly damaged by water in extinguishing a fire on the adjoining premises.

The Rogers & Hamilton Company, Waterbury, Conn., issue pages describing new patterns of goods which they are putting upon the market in tasty satin-lined boxes or cases especially designed for the fall trade. One of these refers to their Normandie pattern in old silver and illustrates a Pie Knife. An earlier issue shows their No. 133 Combination Set.

The Coleman Hardware Company, 55 Dearborn street, Chicago, and Morris, Ill., have issued a price list showing their Hardware specialties. It represents the Nickel Hangers and Rail, the J. G. C. Hanger, Nickel Spring Hinge, J. G. C. Spring Hinge, Nickel Stay Roller, Nickel Farm Gate and Shumard Sash Balance.

Joshua Britton & Son, Stoughton, Mass., have made a decided improvement in their Henry's Patent Combination Haft, of which they are manufacturers, and which they are now putting more prominently on the market. This Tool Holder, which is illustrated in their advertisement on page 58, carries the tools in the end of the holder in which they are used, so that when the tool is opened all the tools contained in it are in view with their points up, thus facilitating greatly the selection of the one wanted. The principal improvement which has been made is in the cap or sleeve, which is now made of brass nickel plated, instead of hard rubber, as heretofore. The tool is thus rendered much more durable, while at the same time it is given a handsomer appearance. The handle is made of rosewood. Other points made in regard to it are: That the same motion that unscrews the instrument removes the cap that covers the surplus tools; that no wrench is required and that the tool has a solid handle and can be used with a mallet.

C. & W. McClean, St. Louis, Mo., have issued their No. 700 illustrated catalogue, which contains nearly 100 pages, which are devoted to an exhibition of their line of Fishing Nets and Tackle, Guns, Sporting Implements, &c. An interesting line of Nets, which are not usually found in such publications, is given a prominent place, while Fish Hooks, Rods in large variety, Rod Fittings, Reels, Spoons, &c., are fully represented, with many specialties in this line. Traps, Guns, Gun Implements and miscellaneous Sporting Goods are also illustrated. The catalogue closes with a complete index.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., have issued, October 12, a 40-page catalogue of seasonal and staple goods. Skates, Sleigh Bells, Hand Sleighs and Snow Shovels are given a

prominent place, with a variety of other goods, including an extensive line of Clocks.

W. C. Burkinshaw has opened an office at 83 John street, New York, in which he will conduct the business of commission merchant and importer of Hardware. He has made arrangements with James Deakin & Sons, Sheffield, England, for the sole agency of their goods in the United States, and is prepared to execute orders for Ivory and Celluloid Table Cutlery, Stag Carvers, Pearl Dessert Knives, &c. In addition to the above Mr. Burkinshaw is prepared to receive orders for the exportation of American goods, and offers for sale here a line of fancy articles suitable for the jewelry and notion business.

A copy of the Colorado *Exchange Journal* for October 6 has reached us. It contains a great variety of matter, historical, biographical and industrial, relating to the City of Pueblo, accompanied with profuse illustrations. Among the engravings are a portrait of Guy T. Nash and a view of the building of the Pueblo Hardware Company, of which he is secretary and treasurer. From the biographical sketch in connection with the portrait we learn that Mr. Nash was born in Vermont in 1842, was a member of the Twelfth Vermont Regiment during the war, migrated to Iowa in 1870, went into the Hardware business at Fort Dodge and subsequently at Humboldt, and removed to Pueblo in 1885. The Pueblo Hardware Company are stated to be greatly increasing their business under his management, and their field enlarges as the territory tributary to Pueblo is widened by the rapid extension of railroad facilities.

The Miller Lock Company, Philadelphia, Pa., have issued their catalogue No. 8, which is devoted to an exhibition of their line of Champion Locks, of which full descriptions and illustrations are given. The extent of the line of Keyless Locks and the advances the company are making in this direction are to be noticed. They advise us that during the season just past the Young Men's Christian Association in this city secured an outfit of these Locks for its gymnasium lockers, and that other important orders are in hand, with a growing demand both home and export.

The American Machine Company, Philadelphia, Pa., for whom John H. Graham & Co., 118 Chambers street, New York, are agents, have issued a neat descriptive catalogue of the Crown Meat Cutter, of which we gave an illustrated description a few weeks ago. The catalogue explains the construction and operation of the machine, and gives testimonials in regard to its use, and a number of recipes for dishes, in the preparation of which it may be used. They also send out a unique and effective colored lithographic advertising card, which is utilized in calling attention to the machine.

Buhl, Sons & Co., Detroit, Mich., announce that they have admitted Charles H. Jacobs as a member of their firm, dating from August 1, 1888.

McIntosh, Huntington & Co., Cleveland, Ohio, have issued their winter circular of seasonable goods and specialties. It relates to Skates, Children's Sleighs, Toy Banks, Carvers, Registers, Foot Warmers, Lanterns, Snow Shovels, &c.

The Detroit Copper and Brass Rolling Mills, Detroit, Mich., of which C. H. Buhl is president, R. W. Gillet, vice-president, and L. H. Jones, secretary, have issued a convenient price list of their manufactures, in which pains have been taken to make the typographical arrangement such as to facilitate its use. They call attention to the completion of their new factory and their facilities for filling orders promptly.

In an article in regard to protection against polluted water, a recent issue of the *Sanitarian*, referring to the importance of Filters and alluding to some of the methods on which they have been constructed, says:

Porous stone, both natural and artificial, of various degrees of texture, has been extensively used in recent years, and with greatly improved results. Of such, in particular, is the Gate City Stone Filter, which uses a natural stone. It is put up in several varieties—china, glass and stone—and we are satisfied, from personal observation, that it comprehends the best requirements. Professor J. J. Browne, of Syracuse University, Syracuse, N. Y., after using one continuously in his laboratory for several months, writes: "I have thoroughly tested it. The foulest water I could obtain was first passed through the filter, and afterward examined with the microscope at intervals for a number of days without detecting the least trace of animalcule. Its decolorizing power is easily shown by filtering ink, iodide of starch, iodide of mercury, &c. I think that many who have witnessed these experiments are convinced that it has no equal. The ease with which it is cleansed (so obvious to all) is superior to every Filter of which I have any knowledge."

The Filter referred to will be recognized as that of the Gate City Stone Filter Company, 46 Murray street, New York, who manufacture, it will be remembered, a large variety of patterns, in most of which the ice used for cooling the water is kept in a separate chamber, thus preventing any contamination from that source.

The Pony Hand Elevator.

In connection with the description of the elevator which was given in our last issue, our attention has been called to the Humphrey Pony Hand Elevator, manufactured by the Edward Storm Spring Company, Poughkeepsie, N. Y., for whom John H. Graham & Co., 113 Chambers street, New York, are agents. The need of such an elevator as was described in our last issue led to the putting of the Pony Hand Elevator on the market, and it is regarded as meeting the needs of the trade and giving an elevator with a capacity of 500 pounds at a moderate expense. In the advertisement of the company on page 85 an illustration is given showing its arrangement, and its comparative inexpensiveness is evident when it is remembered that the price of the fixtures is \$36 per set, with a discount to the trade of 15 per cent. We are also advised that, when desired, the company will furnish the fixtures, fastened to a 1½-inch shelf, to fit exactly the top of well hole, at an extra cost of from \$2.50 to \$4, net, according to size. In such case, it is necessary for purchasers to give the size of the well hole, inside measurement. In connection with their catalogue, giving full description of this machine, the company send out a number of certificates from parties who have used them, and among them are several Hardware houses.

Tendencies in Trade.

We have received a number of letters from Hardware houses in different parts of the country with reference to the position of the wholesale houses and the question as to whether or not their business is being undermined on account of an increase in direct dealings between the manufacturers and the smaller trade. Referring to this matter a well-informed Hardwareman of Colorado writes as follows:

The last two years have shown the manufacturer and consumer getting nearer all the time. Any one acquainted with New York and Chicago, and visiting both places, cannot have failed to notice that the signs on Lake street, Chicago, are duplicating each year more and more the manufacturers' signs on Chambers street, New York. From simple agencies in Chicago, taking orders to be filled from

factory, stocks are now carried in Chicago by manufacturers, and, what is more, we can buy many goods from manufacturers as cheaply in Chicago as in New York. The jobber seems to be going West, and to-day the Missouri River jobbers are selling many goods as cheaply as those in Chicago and St. Louis. To us these things all appear to be straws, showing the way of the wind. I do not doubt, however, that the jobbing business is on the increase, because population is increasing, but I do not think it is in the same proportion.

We have also received the following careful review of the situation from a prominent Hardware merchant in Iowa, whose views in regard to the tendencies of trade are entitled to careful attention:

Our experience is that the great majority of Hardware retailers buy from the jobbers and not from the manufacturers. A few of the largest retailers probably buy East from certain manufacturers, or manufacturers and jobbers combined, who make it a point to solicit the business of this class of trade. The history of the jobbing Hardware trade from New York City west points to the fact that a jobbing center is a necessity every 200 miles at least. Notwithstanding the heroic efforts made by Chicago and St. Louis jobbers to corral the entire trade west of them, these smaller jobbing centers every 200 miles or less have continued to grow, flourish and increase. Retail Hardware dealers do not carry nowadays anywhere near the stock they formerly did when forced to buy from distant markets. This decided advantage is appreciated and accepted now as a necessity by the trade generally. Hence the establishment of supply-houses at convenient distances. Owing to the rapid increase and importance of jobbing centers throughout the more populous portions of the West, we find that jobbers located in the two largest Western centers have been forced to seek for trade in the extreme West, and to-day their heaviest trade comes from these sections, where no convenient supply-houses have as yet been established. To still further increase their sales new and varied lines of goods, foreign to Hardware, have been added to their stocks. This would not have been necessary had not their sales of Hardware been curtailed to a serious extent by the numerous jobbing centers that have sprung up and monopolized trade formerly purchasing their supplies from the two cities referred to.

It is not unreasonable to believe that the history of the jobbing Hardware trade of New York City will repeat itself as far as Chicago is concerned. We regard it as simply the natural course of events. Already a large number of prominent manufacturers are represented in Chicago, many of them carrying a full stock of goods there. When this becomes general we predict that the business of the West (as far as jobbing Hardware is concerned) will be done by the manufacturers' branch houses in Chicago, mainly through, and by means of, these jobbing centers scattered throughout the country at convenient distances. At present there is a severe fight for trade, and, possibly, existence. We think the remedy is with the manufacturers, who seem to be slow in appreciating the situation.

A house in Ohio compares as follows their experience with that of F. B. Straub & Co., the table of whose purchases was published in our issue, 11th inst.:

Regarding the subject in question we are very strongly of the opinion that the Hardware merchant of this section at least is buying his goods more generally from manufacturers (or their agents) than

from jobbers, and that the effort of the retail Hardwareman is now, as it has been for years past, to get nearer the manufacturer in his dealings. Our own experience has been that in the years from 1870 to 1875 nearly 75 per cent. of our purchases were from jobbers, two-thirds of whom were Western, of our own locality. Since that period our purchases from jobbers have gradually declined and those from manufacturers proportionately increased, until in the last five years the average percentages have nearly reversed. As between Western and Eastern manufacturers, our purchases are gradually working in favor of Western.

From a wholesale house in Minnesota we have the following review of the situation:

We have noticed the article in *The Iron Age* of Fred. P. Straub & Co., to which you refer, and, while in our own experience we have not the matter so accurately tabulated as the above firm, yet we have observed a tendency in the direction indicated by their table. We think this arises, perhaps, more from the fact that manufacturers are soliciting the general trade more than formerly, rather than that the trade are looking after the manufacturers. Many small manufactories are being established over the country, and, usually, they introduce their goods by going to the general trade. The jobbing trade is also being distributed over the country, and not concentrated in New York, Chicago, St. Louis and other large cities, as formerly, in our opinion.

A well-known house in Michigan in the following letter refer especially to the importance of the jobber as a distributor to the retail trade:

Our experience is that, with proper manipulation, we are able to get fully as good terms and prices from Hardware jobbers as from manufacturers. Large manufacturers especially protect and favor jobbers to such an extent that we can get fully as favorable quotations from them as from the manufacturers, and, while this state of things continues, we feel inclined to give the jobber the preference. The jobbing institutions of the country are a necessity, and, with the majority of the retail dealers, cannot be dispensed with.

Referring to the general question a Hardwareman in Iowa writes as follows:

There exists to-day a tendency on the part of retailers through the West to buy of jobbers, for the reason that the jobbers will meet any prices quoted by the manufacturers. Again, the retailers are lightly stocked and find it convenient to assort up with large jobbing houses. My impression is that the big jobber has got the manufacturer by the throat and compels him to sell at his own offer, just as the bondholder has Uncle Sam by the throat and makes him come down handsomely.

A Kansas Hardwareman refers as follows to purchases from manufacturers and jobbers:

In my opinion there is a steady increase in trade between retail dealers and manufacturers where the retailer is so situated that he can pay spot cash and does enough business to warrant his buying in large quantities and original packages. Location has much to do with his trade, as a Western retailer can better afford to buy from a Western jobber than from an Eastern manufacturer on account of getting his goods quicker, while with Eastern retailers, I should judge, the most of their trade would be with manufacturers. A Western manufacturer who gave the retailer the benefit of the jobber's profit would, in my opinion, get the bulk of the Western trade, even on spot cash basis.

FIRST PRIZE LIST IN CIPHER COMPETITION.

The following is the list of ten-letter words which secured the first prize in this competition, the list being that submitted by C. F. Rood, of Grand Rapids, Mich.

Abjunctive	Clypeiform	Disgruntle	Felspathic	Graciously	Ideography	Logarithms
Abridgment	Coadjument	Disharmony	Fieldsport	Grainmoths	Inchoately	Longimetry
Absorptive	Coadjuting	Dispatcher	Fieldworks	Gramineous	Incompared	Longitudes
Assumption	Coadjutive	Disputable	Figurantes	Grandevity	Incubatory	Lovetricks
Adjunctive	Codfishery	Disulphate	Figurately	Grandevous	Inculpated	Locustbean
Admonisher	Coequality	Ditrochean	Feltgrains	Granulites	Inculpates	Lubricants
Afterglows	Cogitabund	Divulgates	Fingerpost	Gravelpits	Incurables	Lubricated
Agrypnosis	Cognizable	Divulgater	Fishmarket	Grapholite	Incurvated	Lubricates
Albuminose	Cognizably	Dithyrambs	Fishmonger	Grayhounds	Incurvates	Lucratives
Alcyoniums	Columnated	Dockmaster	Fishtrowel	Greyhounds	Indevoutly	Lupinaster
Alpenstock	Combshaped	Doctrinals	Fishtackle	Grievously	Indorsable	Lurcations
Ambilevous	Compatible	Documental	Fisherboat	Groundbait	Indraughts	Lychnobite
Ambrotypes	Compatibly	Dogfancier	Fishertown	Groundbase	Inexorably	Lympheduct
Amphoteric	Complainer	Dogwatches	Fivescourt	Growtheads	Infamously	Mackintosh
Amurcosity	Complaints	Dogmatizes	Flamineous	Guineafowl	Infuscated	Magnitudes
Angiosperm	Complexity	Dogmatizer	Flamingoes	Guineaworm	Ingrateful	Mailroutes
Angulosity	Completing	Dolphinets	Fleshwound	Gulfstream	Inguatable	Mangobirds
Antichlors	Compulsive	Domestical	Flourished	Gunpowders	Inoculated	Manichords
Armslength	Computable	Dragonfish	Flowerbuds	Guntackles	Inoculates	Manifestly
Apothecium	Confusable	Dragonlike	Flowerings	Gynarchies	Inosculate	Mantichors
Aouchment	Confusedly	Drayplough	Flunkeydom	Gyrfalcons	Intercloud	Manuscript
Backfriend	Confutable	Drinkables	Fluohydric	Hacquetons	Interlocks	Marketings
Backslider	Conjugated	Dreamingly	Flustering	Hairgloves	Interplays	Mashing tub
Bankcredit	Conjugates	Doublestar	Fluxations	Halfprices	Interposals	Matronizes
Bankruptcy	Conspiracy	Doubtingly	Flyingcamp	Halfrounds	Intershock	Matronized
Banstickle	Consultary	Drawgloves	Flyingshot	Half tongue	Introduces	Mayflowers
Batfowling	Consultive	Droptables	Fluxionary	Handiworks	Introsumed	Meadowpink
Beadleship	Consumable	Droplights	Flypowders	Handsomely	Involucred	Mechanurgy
Becomingly	Copulative	Dumpingcar	Foliatures	Handygripe	Involucet	Megalornis
Bewitchful	Cornfields	Dulcorates	Fogwhistle	Handyworks	Isothermal	Megaphyton
Bichromate	Corymbiate	Dumbwaiter	Forcipated	Harlequins	Ivoryblack	Mendacious
Bifurcated	Courtlands	Duplicates	Forecabins	Harmonites	Ivymantled	Merchantly
Binoculate	Covetingly	Dwarfishly	Forensical	Harmonized	Jackfruits	Meropidans
Bipetalous	Cowardship	Dynamiters	Foreshadow	Harmonizes	Jacktimber	Metaphoric
Birdsmouth	Creditably	Earthbound	Forgivable	Harvestbug	Jacktowels	Metaphysic
Birthplace	Crustalogy	Edaciously	Forinsecal	Harvestfly	Jauntycars	Methodical
Bisulphate	Culminated	Educations	Forethinks	Hawseblock	Jeoparding	Micropyles
Blacksmith	Curtaildog	Edulcorant	Formalized	Headblocks	Jerfalcons	Microphyte
Blackthorn	Cushewbird	Eidographs	Formalizes	Headspring	Jockeyship	Mineralogy
Blackstone	Customable	Ejulations	Formatives	Headstrong	Journalism	Mintjuleps
Bladesmith	Customably	Elbowchair	Formidable	Heartbonds	Journalist	Minutejack
Blandisher	Cyathiform	Elucidator	Formidably	Heartlings	Journalize	Mischarged
Blastoderm	Cymiferous	Eluxations	Formulates	Hectograms	Judicatory	Miscounted
Blockhouse	Dairyhouse	Emblazonry	Formulated	Hemicranys	Kalsomined	Misexpound
Blustering	Daughterly	Emulations	Fornicated	Hemidactyl	Kalsominer	Misfortune
Boastingly	Deaconship	Emuscation	Fornicates	Hemitropal	Kaligenous	Misgrafted
Bolstering	Dearbought	Endorhizal	Formulized	Herdswoman	Karpholite	Mistakenly
Bondtimber	Debasingly	Engarboils	Formulizes	Hexagynous	Kentishrag	Mistflower
Bountyhead	Debatingly	Epistolary	Formulizes	Hexandrous	Kampylites	Misvouched
Boxhauling	Debonairly	Epulations	Fortalices	Hieromancy	Kidneyform	Miswrought
Brachydome	Decagynous	Exhaustion	Fortilages	Hindermost	Kidneywort	Mockprivet
Bracketing	Decimators	Equivocals	Fortunized	Hogpeanuts	Kingcrafts	Moderating
Breastplow	Declinator	Euharmonic	Fortunizes	Holingaxes	Kingtables	Modulating
Bridlepath	Decorating	Euphonical	Fosterling	Holystoned	Knifetrays	Monkeypats
Brightsome	Decubation	Euphorbial	Foxhunters	Honeystalk	Knifeboard	Mouldering
Brownstudy	Defacingly	Euphoniads	Franchised	Hortensial	Labyrinth	Mouldwarps
Bucholzite	Defamingly	Eutyrians	Freakishly	Hospitaler	Lachrymose	Molybdates
Butchering	Defaulting	Evulgation	Freightcar	Hospitable	Lacquering	Molybderas
Butlership	Deflouring	Excubation	Frolicsome	Hospitably	Lactifuges	Monarchist
Calmbrowed	Defluxions	Excubatory	Fulciments	Hotbrained	Ladycourts	Monarchies
Caloriduct	Deforciant	Excusatory	Fulminated	Hourangles	Ladyabower	Monarchize
Censurably	Defrauding	Exhausting	Fulminates	Hourplates	Ladyfinger	Monkeycups
Centiloquy	Delightous	Expansibly	Fumatories	Humanizers	Lambrequin	Monkeyrail
Centralism	Demigroat	Explicator	Fumigatory	Humblecows	Lampyrines	Monkeytail
Chalkstone	Dentiloquy	Exsudation	Furcations	Humoralist	Landforces	Monradites
Charmingly	Dentiscalp	Exudations	Furzechats	Humpbacked	Languished	Monticules
Cheatingly	Depilatory	Fabulosity	Gardenplot	Hyalotypes	Languisher	Mordicants
Cherubical	Depositary	Factioners	Gardenship	Hydrations	Laniferous	Mortalized
Chevrolet	Designator	Factionously	Gasfixture	Hydraulics	Lanigerous	Mortalizes
Chiefbaron	Dispairful	Factorship	Gasometric	Hydromancy	Lapjointed	Motherings
Chimney-pot	Despicably	Factorings	Gazehounds	Hydropical	Lathbricks	Musicalbox
Chiroplast	Despotical	Fahlunites	Gelatinous	Hydrotical	Lavishment	Mucronated
Chivalrous	Destinably	Factorizes	Gerfalcons	Hydropults	Lawmongers	Mucronates
Chloridate	Dialectors	Factorized	Girandoles	Hyemations	Lectionary	Multifaced
Choriambus	Dichromate	Fairspoken	Glandiform	Hyperbatic	Lengthways	Muscadine
Chromatype	Diplomates	Fanblowers	Glaucanite	Hyperbaton	Leucopathy	Myographic
Chrysolite	Diptychums	Farsighted	Glochidate	Hyperbolus	Lexigraphy	Narcotized
Cismontane	Disaugment	Favoringly	Gnatflower	Hyperbolic	Liefraught	Narcotizes
Claspknife	Disburgeon	Fairystone	Goatmilk	Hyperdulia	Lifeguards	Navelworts
Clinometry	Discounter	Faldistroy	Goatsucker	Hyperoxids	Lighthouse	Navigerous
Clothespin	Discourage	Falterings	Godfathers	Hypnotized	Limehounds	Nebulosity
Clogdances	Discrepant	Faulchions	Goldencups	Hypnotizes	Lithocarp	Neckcloths
Clubfisted	Disculpate	Febriculas	Goldenfish	Hypnotizer	Lithomancy	Neckmoulds
Clustering	Disencharm	Februation	Gormandize	Hypodermic	Lithomarge	Neighorly

Neoplastic	Overwaxing	Platonizes	Promulgate	Sciography	Subtypical	Upholstery
Neuroglias	Oxymuriate	Platyrrhine	Prongbucks	Scrambling	Subverting	Upswarming
Neuropathy	Pachyderms	Plauditory	Procenium	Scrapingly	Super'onic	Upthrowing
Nightcrows	Packetship	Playground	Provincial	Secularity	Surcingle	Uranalites
Nightmares	Radlocking	Playthings	Prudential	Seducingly	Suroxide	Vanquished
Nightrules	Palindrome	Playwright	Prytaneums	Selfacting	Suzerainty	Vanquishes
Nightwalks	Panegyrist	Pleonastic	Psalmody	Selfaction	Swageblock	Vaporingly
Noctuaries	Panegyrics	Plicatures	Psychiatry	Selfmoving	Swordfight	Vehicular
Noticeably	Panelworks	Plumbagine	Pulmograde	Semaphoric	Symbolized	Ventricans
Nucleiform	Parbuckles	Pneumatics	Punchbowl	Semilunary	Sympathize	Vermifuga
Numerosity	Parbuckled	Pocketfuls	Punctiform	Sepulchring	Symphonize	Vesicatory
Nursechild	Parcelings	Pocketlids	Punishable	Sermonical	Syncarpion	Vestibular
Obduracies	Parchingly	Polyanthus	Purchasing	Serpulidan	Syncopated	Vetchlings
Obdurately	Parchments	Polarchies	Purgaments	Shecklaton	Syncopized	Victualers
Obdurating	Parheliums	Polianthes	Purgations	Shockingly	Synthermal	Vinesawfly
Obfirmated	Parhelions	Polishment	Purgatives	Shoplifter	Tambouring	Violascent
Obfirmates	Parvitudes	Polybasite	Quachiltos	Shopwalker	Tambourine	Vocabulist
Obfuscated	Pastorling	Polychrest	Quamoclit	Shortlived	Tamperings	Volcanized
Oburgated	Patchingly	Polygamist	Quartzoids	Showerbath	Thanksgive	Volcanizes
Observancy	Pathogenic	Polygamize	Quatrefoil	Shrievally	Thornbacks	Voltigeurs
Obsignated	Patronized	Polygamies	Quayberths	Sicklewort	Throwsilk	Vouchsafed
Omnigraphs	Patronizes	Polygraphs	Quincewort	Simulachre	Thumbrings	Vulcanized
Omphazites	Patronymic	Polygenist	Rantipoles	Simulacher	Thumbscrew	Vulcanizes
Opalescing	Peculating	Polymathic	Ravenously	Skylarking	Thyroidal	Vulcanites
Optigraphs	Paintboxes	Polymnites	Ravensduck	Slidegroat	Thy'soidal	Wainscoted
Orangemusk	Pathfinder	Polytheism	Ravishment	Slumbering	Tonguepads	Wakerobins
Orbiculate	Peculation	Porcelains	Readingboy	Smoldering	Toparchies	Wardenship
Ordinately	Peculators	Portglaves	Readopting	Smothering	Touchingly	Watchfires
Orphalines	Pedantiely	Postmarked	Rebukingly	Snakegourd	Tourmaline	Waveringly
Osculating	Pedimanous	Pothangers	Recaptions	Somnopathy	Townclerks	Waxedcloth
Osculatrix	Pentachord	Poundcakes	Reclasping	Southernly	Tradesfolk	Waxmyrtles
Ostracized	Pentroughs	Poundrates	Reconfirms	Spathiform	Tradewinds	Weighboard
Outblazing	Penultimas	Practively	Recoursing	Speculator	Traducings	Weightlocks
Outbraving	Perflating	Pratincole	Recubation	Spermatoid	Traducible	Welcomings
Outbraying	Perflation	Preambling	Recusation	Sphenogram	Tragedians	Wheatbirds
Outbrazen	Perigynous	Precautions	Redactions	Sphenoidal	Transfixed	Wheatplums
Outclimbed	Perilymphs	Precaution	Redoubling	Spheroidal	Translucid	Whipgrafs
Outdrawing	Perishably	Preciously	Redoubting	Spiculated	Transmoved	Whirlabout
Outflanked	Permutably	Precluding	Reductions	Splaimouth	Trapeziums	Whirlbones
Outflashed	Persolving	Preclusion	Regulation	Sporangium	Trapezoids	Whirlblands
Outlandish	Personalty	Predations	Reimplants	Sportingly	Travelings	Wildgraves
Outlaughed	Persuading	Predicants	Relocating	Sportively	Tremblings	Windbreaks
Outlawries	Petaliform	Prejudicial	Remolding	Sprightly	Trenchplow	Windhovers
Outleaping	Phenogamic	Prelations	Replicants	Springback	Trialogues	Windsucker
Outmarched	Philomaths	Preobtains	Republican	Springbuck	Triumphals	Winevaults
Outpraying	Philomathy	Presbyopic	Resaluting	Springhalt	Troublings	Wingcovert
Outrivald	Phlegmatic	Presbyopia	Resudation	Springhead	Trucklings	Wingstroke
Outsparkle	Pholadites	Prestimony	Resumption	Springlock	Tumefying	Wirecloths
Outwalking	Phylacters	Presumably	Revictuals	Spurgeflox	Turmalines	Witherband
Outwearing	Phycomater	Previously	Revocating	Stampedging	Twaincloud	Witchmeals
Overacting	Physograde	Pricklouse	Revokingly	Staphyline	Tympanized	Wolfamine
Overbuilds	Phytochimy	Pricklyash	Rheumatics	Starveling	Tympanizes	Wolfspeach
Overbuying	Picturable	Prickshaft	Rhumblines	Steamwinch	Ulcerating	Womanishly
Overdating	Pigmentary	Princedom	Ridgebands	Stenograph	Ulcerations	Workingday
Overflying	Pigmentous	Prizecourt	Robinwakes	Stockinger	Underchaps	Worktables
Overgazing	Pilotbread	Proclaimed	Rochealums	Stupefying	Underclays	Wormshaped
Overlading	Pilotjacks	Procumbent	Rockplants	Subalmoner	Undercoats	Worshipful
Overlaving	Pinacloths	Producents	Roundelays	Subcentral	Underlocks	Wrainbolts
Overlavish	Pinksaucer	Producible	Rudimental	Subcharter	Underplots	Wreathings
Overlaying	Pitchforks	Productile	Rudolphine	Subcordate	Underplays	Wringstave
Overlights	Pitchworks	Productive	Rushcandle	Subdialect	Understock	Wringbolts
Overnights	Placoderms	Profitable	Safetyplug	Subjecting	Unimproved	Wrongheads
Overpaints	Plaguespot	Profitably	Sandmyrtle	Subkingdom	Upbearings	Wrongtimed
Overpaying	Plainworks	Profulgent	Sardonically	Sublimated	Uplowings	Xylographs
Overplying	Planetoids	Profundity	Scampering	Submediant	Upbreaking	Yachtclubs
Overslaugh	Planimetry	Projecting	Schemingly	Subreption	Upheavings	Zincamyles
Overslight	Plastering	Prolapsing	Scherzando	Subrogated	Uphoarding	Zincethyls
Overtaking	Platonized	Proleptics	Scholarity	Subtrahend	Upholdings	Zincethyl

ADDITIONAL COMPETITIONS.

In the letters from our readers concerning this competition received during the weeks since its announcement, we have been favored with various suggestions of other competitions similar in character and object. We feel disposed to announce additional contests, but before doing so would like to hear further from our subscribers as to their ideas in the premises. Accordingly, we defer the matter for the time being, and trust all who have any ideas or suggestions on this subject will write us. What shall be the next contest? What subject will be of the greatest value to our readers? We want a large number of letters.

On Friday last the Scranton Steel Company, of Scranton, Pa., rolled 55 tons of 60-pound rails in one hour, the largest record thus far.

The Peoria Cordage Company, Peoria, Ill., have been organized with a capital stock of \$200,000, and are now putting up a factory 84 feet front by 150 feet deep, three stories high. It is expected that they will commence manufacturing binder twine about the 1st of February, and

will add rope machines at an early date. The company have additional ground upon which they can extend their business by enlargement of factory, and are also reported to have ample capital to carry on a successful business. Martin Kingman, of Kingman & Co., manufacturers of farm machinery, is president, and E. C. Heidrich, who has been connected with the Miamisburg Binder Twine Cordage Company for the past five years, and previous to that with John Bonte & Son, Cincin-

nati, Ohio, is vice-president, and will be the general superintendent of factory. Kingman & Co. are largely interested in this new concern, and it is expected that they will market extensively the product of the twine factory.

The Southern Railway and Steamship Association have issued a new rate sheet on pig iron, showing an advance of 20 cents a ton on the figures published in *The Iron Age* of September 27, page 458.

The Solitaire Coffee Urn.

We illustrate below this article which is manufactured by the Charles F. Henis Company, Philadelphia, Pa., for whom S. A. Haines is agent, 90 Chambers street, New York. It is represented as placed in the cup in the manner in which it is used. This simple and attractive article consists of a cylinder or urn about 4 inches deep and 2½ inches in diameter, with perforated bottom with a fine screen, and an encircling flange which rests on the top of the cup. The urn has, it will be observed, three projecting ribs which fit into openings in the encircling flange, permitting the urn to rest on the bottom of the cup. In this position the requisite quantity of boiling water is poured upon the coffee which is placed in the urn, which is permitted to remain in that position for a few minutes until the full strength of the coffee is extracted. The urn is then raised through the flange which remains stationary on the edge of the cup until the three



The Solitaire Coffee Urn.

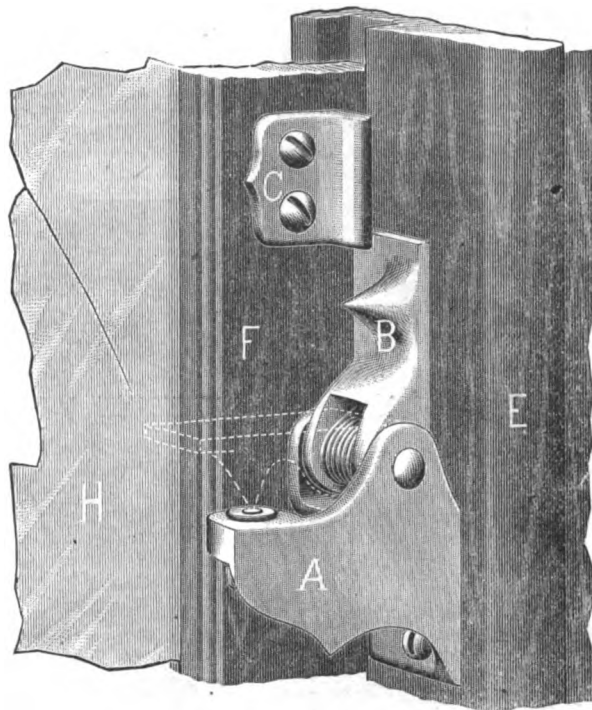
projecting ribs are out of the notches, when slightly turning the urn it takes the position shown in the illustration. The urn is thus supported on a flange while the coffee percolates into the cup beneath. This article is neatly, and well made and finished in nickel plate. Attention is called by the manufacturers to the advantages of this simple contrivance as enabling one to have a cup of excellent coffee without the inconvenience that is attendant in making it in the usual way. The moderate price at which it is offered is a point deserving the attention of the trade, as is intended to be retailed at 25 cents.

The Rouser Burglar Alarm.

This article, which is illustrated in the cut given below, is manufactured by E. C. Ellwood, Green's Farms, Conn. It will be seen at a glance that this is a device for exploding a cartridge when the window or door to which it is applied is opened. The illustration represents it as attached to the right side of the window frame on the stop bead E, F being a portion of the sash. The hammer B is pivoted to the post A by a pin, as shown. The hammer when the alarm is set is held up by the stop C, which is screwed to the sash. When the hammer is raised to this position tension is put upon a coiled spring which encircles the pin above mentioned, and when the sash is raised a slight distance the stop C passes off the end of the

hammer B, and the spring carries down the hammer, the point of which strikes the head of the cartridge, as indicated in the dotted lines. The cartridges used in this alarm are Smith & Wesson's 32 calibre central fire blanks. It is pointed out that

cut; and the less the throw the shorter the cut. This box is referred to as cutting stalks with ease and rapidity, and is regarded as filling a long-felt want for a box that will handle corn stalks as well as straw with equal facility. The moderate



The Rouser Burglar Alarm.

the stop C may be so set that a very slight upward motion of the sash will free the hammer so that the alarm will operate before a burglar can pry up the lower sash enough to break a sash fastener. This device is also made in modified styles for application to doors, and it can also be readily attached to outside blinds. It is made in different styles of finish.

Richmond Champion Section Self-Feed Cutter.

The Wayne Works, Richmond, Ind., are making this machine, which is represented in the accompanying illustration, and its name indicates some of its special features. It is pointed out that the machine will cut



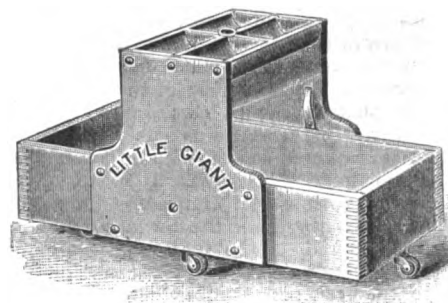
Richmond Champion Section Self-Feed Cutter.

any length the operator requires, and can be changed instantly by raising or lowering the stop on the left-hand side of the box, by merely slacking up the thumb-nut. This thumb-nut controls the greater or less throw of the feed rolls, and the greater the throw of the feed rolls the longer the

price at which it is furnished is also alluded to, as well as its large capacity, it having 11-inch throw. In case of breakage any part can readily be renewed.

Farrier's Tool-Box.

Wells Bros. & Co., Greenfield, Mass., are putting on the market the Little Giant Farrier's Tool-Box, a cut of which is herewith given. It is, as its name implies, a



Farrier's Tool Box.

box for horseshoers' tools, and is described as made of thoroughly seasoned stock, lock corner, mortised bottom, and side pieces finely finished and thoroughly made. It is stated that this case, properly used, will last a horseshoer much longer than those commonly in use. The moderate price at which it is offered is also alluded to.

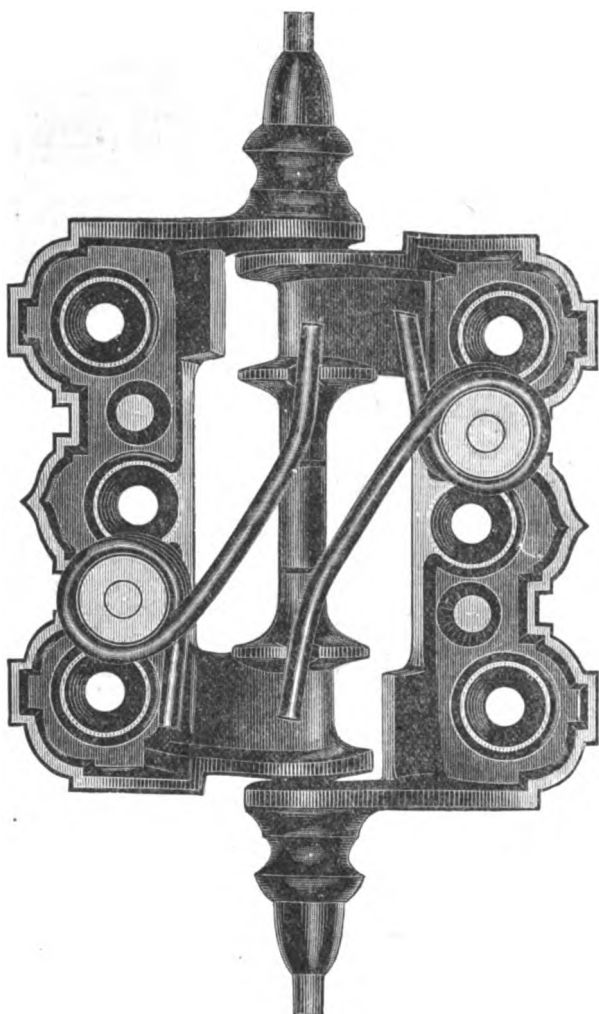
The new steel steamship *Corona*, built by Neafie & Levy for the Oregon Navigation Company, made a successful trial trip on the Delaware, on Saturday. A peculiarity about the *Corona* is that her masts, spars and decks, as well as her hull, are entirely of steel. She is 235 feet long, 36 feet beam and 23½ feet depth of hold, with triple-expansion engines of 1350 horsepower, with cylinders 21, 30 and 50 inches diameter and 3-foot stroke.

The J. G. C. Spring Hinge.

This hinge has recently been put on the market by the Coleman Hardware Company, 55 Dearborn street, Chicago, and

constructed that it may easily be placed in position. This device obviates the necessity of having a large iron plate provided with a number of holes, and also of cutting holes in the edge of the bench. It is care-

men to handle them. The lift is about 1 foot per day and it then takes a day to reset the jacks. The cost is estimated at about \$40,000.



The J. G. C. Spring Hinge.

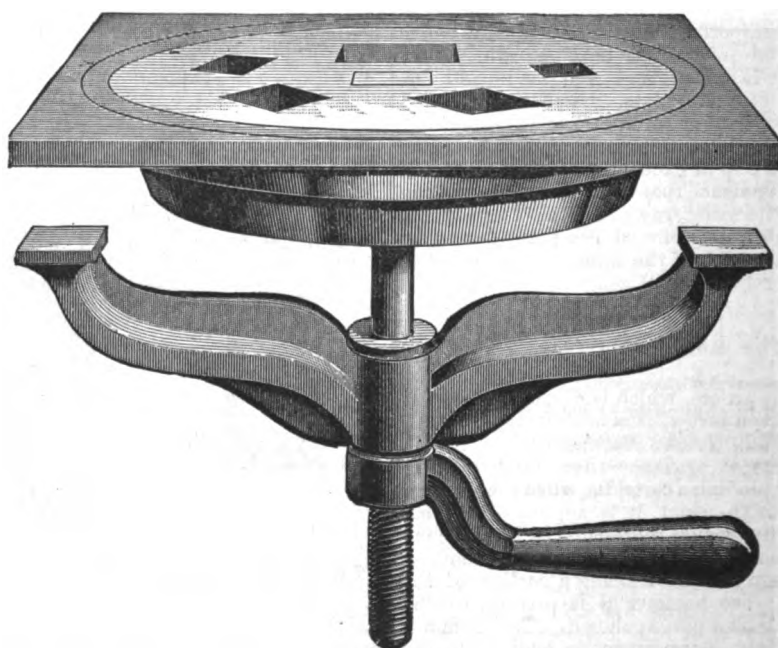
Morris, Ill. It is represented in the illustration herewith given, and has, it will be observed, two long springs arranged as shown in the cut, which are referred to as giving great elasticity and equalizing the tension. The simplicity of the hinge, the fact that it cannot come apart, that it is reversible and holds the door either open or closed, as desired, are points that are made in regard to it. It is put on the market with special claims for its merits as a light hinge, and the low price at which it is offered to the trade is also alluded to. Every pair is warranted satisfactory to the user, and samples will be sent to the dealer on application.

The Arcade Revolving Bench Plate.

An article which is said to be meeting with favor at the hands of metal workers, tinnerns, and others engaged in kindred trades, is a bench plate which has been placed on the market by F. E. Thompson, Elkhart, Ind. In the device which is here shown in general view the recently incorporated features are a square top instead of a round one and a more thoroughly braced underpiece. This bench plate is claimed by the makers to be adapted to receive any of the stakes, shears or other tools used in connection with bench work in the shops of tinnerns and sheet-metal workers. By its use tools can be turned in any position without being removed from it. Shears may be held at two angles, a feature which all the trade will appreciate. It is of comparatively small size, occupying a space 9 x 9 inches on the bench, and is so con-

fully made and very durable in all its parts.

The McCormick offices in Chicago are being jacked up 6 feet 5 inches to meet



Improved Revolving Bench Plate.

the changes in street gradients. The building is 100 x 125 feet, six stories high and weighs nearly 20,000 tons. Several thousand screw-jacks are required, and 300

men to handle them. The lift is about 1 foot per day and it then takes a day to reset the jacks. The cost is estimated at about \$40,000.

The Clipper Grinder No. 2.

The accompanying illustration represents this machine, which is made by the Higginum Mfg. Corporation, 189 and 191 Water street, New York. It is a small, neat and compact machine for sharpening small tools, knives, &c. It has a grinding wheel 6 inches in diameter, 1 1/4-inch face. It is called a free grit stone, and is made under an English patent. It is described as grinding a tool quickly without draw-



The Clipper Grinder No. 2.

ing the temper. It runs in a trough of water, and is geared to revolve four times to one turn of the crank.

The swaying of the Washington monument when moved by the wind, as well as the expansion caused by the sun on its eastern side, is accurately indicated by a steel wire and plumb bob, suspended from a point 174 feet above the earth. When the structure is at rest the plumb line exactly corresponds with vertical marks.

Contracts were given to English shipbuilders last week for the building of ten tank oil-carrying steamships for use between Europe and Philadelphia and New

York. The recent disasters to the tank steamships *Ville de Calais* and *Hafis*, it is said, will have no effect in preventing the building of tank vessels.

CURRENT HARDWARE PRICES.

OCTOBER 24, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Perfection, 1000—	
Black & Goldmark's	
F. L. Waterproof, 1-10's	dis 25
E. B. Trimmer Edge, 1-10's	25 1/2
R. B. Ground Edge, Central Fire, 1-10's	70 1/2
Double Waterproof, 1-10's	7 1/4
Musket Waterproof, 1-10's	50 1/2
G. D.	25 1/2
A. B.	30 1/2
Union Metallic Cartridge Co.	
F. C. Trimmer	50 1/2
F. L. Ground	65 1/2
Cent. Fire Ground	70 1/2
Double Waterproof	7 1/4
Double Waterproof, 1-10's	14 1/2
A. B. Genuine Imported	45 1/2
Wey's E. B.	54 1/2
Wey's D. Waterproof, Central Fire	55 1/2

Cartridges—	
Rim Fire Cartridges	dis 50 1/2 1/2 1/2
Rim Fire Military	dis 15 1/2 1/2
Central Fire, Pistol and Rifle	dis 35 1/2 1/2
Central Fire, Military	dis 15 1/2 1/2
Blank Cartridges, except 22 and 32 cal., an additional 10% over above discounts.	
Blank Cartridges, 22 cal.	\$1.75, dis 1 1/2
Blank Cartridges, 32 cal.	\$3.50, dis 2 1/2
Primed Shells and Bullets	dis 15 1/2 1/2
R. B. Caps, Round Ball	\$1.75, dis 1 1/2
R. B. Caps, Conical Ball, Swaged	\$2.00, dis 2 1/2

Primers—	
German Primers all sizes, and R. L. Caps (for Sturtevant Shells)	\$1.00, dis 2 1/2
All other Primers, all sizes	\$1.20, dis 2 1/2

Shells—	
First quality, 4, 8, 10 and 12 gauge, dis 25 1/2 1/2 1/2	
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30 1/2 1/2 1/2
Star, Club, Rival and 10 gauge, \$9 list	dis 32 1/2
Climax Brands, 12 gauge, \$8 list	\$10 1/2
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30 1/2 1/2 1/2
Self's Combination Shot Shells	dis 15 1/2 1/2
Grass shot Shells, 1st quality	dis 60 1/2
Grass shot Shells, Club, Rival, Climax	dis 65 1/2
A. B. & C. Co., I. X. L., 10 & 12 gauge, dis 40 1/2 1/2 1/2	
A. B. & C. Co., "Special," 14 gauge, dis 30 1/2 1/2 1/2	
A. B. & C. Co., "Special," 10 & 12 gauge, dis 40 1/2 1/2 1/2	
Fowler's Patent, 10 & 12 gauge, \$100	\$3.75

Shells Loaded—	
List No. 19, 1887	dis 20 & 10 1/2

Wads—	
U. M. C. & W. R. A.—B. E., 11 up	\$2.00
U. M. C. & W. R. A.—B. E., 9210	3.30
U. M. C. & W. R. A.—B. E., 723	3.90
U. M. C. & W. R. A.—P. E., 11 up	\$1.10
U. M. C. & W. R. A.—P. E., 9210	4.00
U. M. C. & W. R. A.—P. E., 723	4.90
Wey's B. E., 11 up	\$1.75
Wey's P. E., 11 up	\$2.80

Anvils—	
Single Anvils	\$10, dis 30 & 20 1/2
Peter's Anvil	9 1/2
Armstrong's Mouse Hole	9 1/2
Armstrong's Mouse Hole, Extra	11 1/2
Trenton	9 1/2
Wilkinson's	9 1/2
J. & Riley Carr. Patent Solid	11 1/2

Anvil Vise and Drill—	
Miller's Falls Co.	\$18.00, dis 30
Cheney's Anvil and Vise	dis 25
Allen's Combined Anvil and Vise	\$3, dis 40 & 10 1/2
Moore & Harnes Mfg. Co.	dis 33 1/2

Apple Parers.	
Advance	\$ doz, \$4.75
Antrim Combination	\$ doz, 5.50
Baldwin	\$ doz, 5.25
Champion	\$ doz, 5.25
Eureka, 1888	each, 17.00
Family Bay State	\$ doz, 12.00
Gem	\$ doz, 5.25
Gold Medal	\$ doz, 4.00
Hudson's New '88	\$ doz, 3.75
Ideal	\$ doz, 4.75
Improved Bay State	\$ doz, 30.00
Little Star	\$ doz, 5.00
Monarch	\$ doz, 13.50
New Lightning	\$ doz, 5.50
Orion	\$ doz, 4.00
Penn.	\$ doz, 4.00
Perfection	\$ doz, 4.00
Pomona	\$ doz, 4.00
Rocking Table	\$ doz, 6.00
Turntable	\$ doz, 4.50
Victor	\$ doz, 13.50
Waverly	\$ doz, 4.50
White Mountain	\$ doz, 4.50
72	\$ doz, 4.25
75	\$ doz, 5.75
78	\$ doz, 6.50

Augers and Bits.	
Douglas Mfg. Co.	
Wm. A. Ives & Co.	dis 70
Humphreysville Mfg. Co.	dis 70
French, Swift & Co. (F. H. Beecher)	dis 70
New Haven Copper Co.	dis 60 & 10 1/2
Joe's, Douglas Mfg. Co.	dis 60 & 10 1/2
Joe's, New Haven Copper Co.	dis 60 & 10 1/2
Ives' Circular Lip	dis 80
Patent Solid Head	dis 80
C. E. Jennings & Co., No. 10, extension 1/2	dis 40
C. E. Jennings & Co., No. 30	dis 60
C. E. Jennings & Co., Auger Bits, in fancy boxes	dis 40
Low's, 23 1/4 quarter, No. 8, 9, No. 30, 32	dis 40
Low's Patent Single Twist	dis 45
Low's Jennings' Augers and Bits	dis 50
Imitation Jennings' Bits (new list)	dis 60 & 10 1/2
Pugh's Black	dis 80
Car Bits	dis 60 & 10 1/2
Hommedieu Car Bits	dis 15 1/2
Forster Pat. Auger Bits	dis 10

Yellow Augers—	
Ives	dis 25 & 10
French, Swift & Co.	dis 25 & 10
Low's Adjustable \$ doz, \$45	dis 40 & 10
Stearns	dis 30 & 10
Ives' Expansive, each \$4.50	dis 20
Universal Expansive, each \$4.50	dis 20
Wood's	dis 25 & 10

Expansive Bits—	
Clark's small, \$18, large, \$25	dis 25 & 10
Ives' No. 4, per doz, \$40	dis 25 & 10
Swan's	dis 40
Stearns, No. 1, \$25; No. 2, \$22	dis 35
Stearns' No. 2, \$45	dis 30

Twist Bits—	
Common	\$ gross \$2.75—dis 25
Blond	\$ doz, \$1.10, dis 25 & 10
"Bee"	dis 25 & 10
Double Cut, Shephardson's	dis 45 & 10
Double Cut, Ct. Valley Mfg. Co.	dis 30 & 10
Double Cut, Hartwell's, \$ gro.	35.25
Double Cut, Douglass	dis 40 & 10
Double Cut, Ives'	dis 60 & 10

St. Stock Drills—	
Moore Twist Drills	dis 50 & 10 1/2
Standard	dis 50 & 10 1/2
Cleveland	dis 50 & 10 1/2
Syracuse, for metal	dis 50 & 10 1/2
Syracuse, for wood (wood list)	dis 30 & 10 1/2
Williams' or Holt's, for metal	dis 50 & 10 1/2
Williams' or Holt's, for wood	dis 40 & 10
W. Hommedieu's	dis 15 & 10
Watrous's	dis 15 & 10
Snell's	dis 15 & 10
Snell's Ship Auger Pat. Car Bits	dis 15 & 10

Awl Hairs.	
Sewing, Brass Ferrule	\$3.50 \$ gross—dis 45 & 10
Patent Sewing, Short	\$1.00 \$ doz—dis 40 & 10
Patent Sewing, Long	\$1.20 \$ doz—dis 40 & 10
Patent Peg, Plain Top	\$10.00 \$ gross—dis 45 & 10
Patent Peg, Leather Top	\$12.00 \$ gross—dis 45 & 10

Awls, Brad Nuts, &c.	
Awls, Sewing, Common	\$ gross \$1.70—dis 25
Awls, Shouldered Peg	\$ gross \$2.45—dis 40 & 10
Awls, Patent Peg	\$ gross \$2.45—dis 40 & 10
Awls, Shouldered Brad	\$2.70 \$ gross—dis 35
Awls, Handled Brad	\$7.50 \$ gross—dis 45
Awls, Handled Scratch	\$7.50 \$ gross—dis 35 & 10
Awls, Socket Scratch	\$1.50 \$ doz—dis 25 & 30

Awls and Tool Bits.	
Allen's Bits, A. W. & Tools, No. 20, \$10, dis 15 & 10	
Allen's Ad. Tool Bits, No. 1, \$15; 2, \$15; 3, \$15	dis 25 & 10

Allen's Falls Ad. Tool Bits, No. 1, \$12; 2, \$12; 3, \$12	dis 25
Allen's Combination Haft	\$ doz, \$5
Allen's No. 42, \$10.50, No. 43, \$12.50	dis 70 & 10 1/2
Allen's Stanley's Excelsior, No. 1, \$7.50	dis 30 & 10
Allen's Stanley's Excelsior, No. 2, \$4.00	dis 30 & 10
Allen's Stanley's Excelsior, No. 3, \$4.00	dis 30 & 10

Axes and Special Brands—	
First quality	\$ doz, \$6.00 & \$5.50
Others	\$ doz, \$6.50 & \$5.75

Axle Grease.	
Fraser's, in bulk	\$ doz, \$1.45; \$ doz, \$1.50
Fraser's, in boxes	\$ gross \$0.50
Dixon's Everlasting, in bxs, \$ doz, \$1.20; 2 doz, \$2.20	
Dixon's Everlasting, 10 lb pails, each, \$5	
Lower grades, special brands	\$ gro \$0.50 & \$7

Axles—	
No. 1, 1 1/2 & 3/4 No. 2, 5/4 & 3/4	dis 50 & 10
No. 3, 7/8 & 1 1/8	dis 50 & 10
No. 4, 1 1/2 & 1 3/4	dis 50 & 10
National Wrought Steel Tubular Self-Opening	dis 50 & 10
Standard Farm (1 to 5) and Special Farm (1 to 5)	dis 33 1/2
Less than 10 sets	dis 33 1/2
Over 10 sets	dis 33 1/2
X Strong Exp. (6 to 9), and XX Strong Truck (10 to 16)	dis 10 & 10
Over 10 sets	dis 10 & 10

Ball Bearings—	
Ball Bearings, Pat. \$ doz \$18	dis 60
Ball Bearings—Spring Balances	dis 60
Common \$4	\$ doz, \$1.50—dis 50
Chaulion's Spring Balances	dis 50
Chaulion's Circular Spring Balances	dis 60

Beils.	
Light Brass	dis 70 & 10
Extra Heavy	dis 60 & 10
White Metal	dis 60 & 10
Silver Chrome	dis 33 1/2
Globe (Cone's Patent)	dis 25 & 10

Doors—	
Abbe's	dis 33 1/2
Gong, Yankee	dis 40 & 10
Gong, Barton's	dis 40 & 10
Crank, Taylor's	dis 25 & 10
Crank, Brooks	dis 50 & 10 1/2
Crank, Cone's	dis 10
Crank, Cone's	dis 30 & 10
Lever, Taylor's	dis 60 & 10
Lever, Taylor's	dis 25 & 10
Lever, E. E. & Co's	dis 50 & 10 1/2
Full Brook's	dis 50 & 10 1/2
Full Brook's	dis 25 & 10

Low—	
Common Wrought	dis 20 & 10
Western	dis 20 & 10
Western, Sargent's list	dis 70 & 10
Kentucky "Star"	dis 20 & 10
Kentucky, Sargent's list	dis 70 & 10
Jodge, Genuine Kentucky, new list, dis 70 & 10	
James Star	dis 40 & 10
Farm Bells	\$ doz, \$3.50
Steel Alloy Church and School Bells	dis 40
Bellows—blacksmiths	dis 60 & 10
Molders	dis 40 & 10
Wand Bells	dis 40 & 10
Belting, Rubber.	
Common Standard	dis 70 & 10
Standard	dis 70 & 10
N. Y. & P. Co., Standard	dis 60 & 10
N. Y. & P. Co., Extra Standard	dis 50 & 10
Booth Steps.	
Booth's	\$ doz \$2—dis 80
Booth's	\$ doz \$2—dis 80
Booth's, per doz No. 1, \$10; No. 2, \$9	dis 25 & 10
McGill's	\$ doz \$2—dis 10

Bits—	
Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.	
Bit Holders.	
extension, Barber's	\$ doz \$15.00—dis 40 & 10
extension, Ives'	\$ doz \$20.00—dis 60 & 10
Diagonal	dis 10
Angular	\$ doz \$24.00—dis 40 & 10
Blind Adjusters.	
Domestic	\$ per doz \$3.00—dis 33 1/2
Washburn's Self-Looking	\$ doz \$10.00—dis 60 & 10

Blind Fasteners.	
Macrolia	\$ doz pairs, \$1.00—dis 20 & 10
Van Sand's Screw Pattern	dis 70 & 10
Van Sand's Old Pattern	dis 55 & 10
Washburn's Old Pattern	dis 70 & 10
Merriman's	new list, not
Austin & Eddy No. 2008	dis 70 & 10
Security Gravity	dis 70 & 10

Blind Stables.	
Barbed, 1/2 in. and larger	\$ 3 1/4 & 3 1/2
Barbed, 1/2 in.	\$ 3 1/4 & 3 1/2
Blacks.	
Ordinary Tackle, list April 17, '88	dis 40
Cleveland Block Co., Mal. Iron	dis 50
Novelty Tackle Blocks, Mal. Iron	dis 50

Bells.	
Door and Shutter—	
Cast Iron Barrel, Square, &c.	dis 70 & 10
Cast Iron Shutter Bolts	dis 70 & 10
Cast Iron Chain (Sargent's list)	dis 55 & 10
Ives' Patent Door Bolts	dis 60
Wrought Barrel	dis 70 & 10
Wrought Square	dis 70 & 10
Wrought Shutter, Iron Stanley's list	dis 60 & 10
Wrought Shutter, Brass Knob Stanley's	dis 60 & 10
Wrought Shutter, Sargent's list	dis 60 & 10
Wrought Sunk Flush, Sargent's list	dis 55 & 10
Wrought Sunk Flush, Stanley's list	dis 60 & 10
Wrought R. K. Flush, Com'n Stanley's list	dis 60 & 10

Carriage—	
Com. list June 10, '88	dis 75 & 2 1/2
Phil. pattern, list Oct. '88	dis 75 & 10
Phil. pattern, list Oct. 7, '88	dis 75 & 10
R. B. & W. old list	dis 70
Five—	
Common, list Feb. 28, 1888	dis 70
P. C. B. & N. Co., Empire, list Feb. 28, 1888	dis 70
P. C. B. & N. Co., Philadel., list Oct. '88	dis 82 1/2
P. C. B. & N. Co., Keystone, Phil. list Oct. '88	dis 80
P. C. B. & N. Co., Norway, Phil. list Oct. '88	dis 75 & 10
Am. B. Co., Norway, Phil. list Oct. '88	dis 75 & 10
Am. B. Co., East, Phil. list Oct. '88	dis 80
Am. B. Co., Philadel., list Oct. '88	dis 82 1/2
Am. B. Co., Bay State, list Feb. 28, '88	dis 70
R. H. & W., Philadel., list Oct. 16, 1888	dis 82
R. H. & W., Mfg. Co.	dis 70

Stove and Pione—	
Stove	dis 62 1/2
Flow	dis 62 1/2
Am. B. Co. Stove, Annealed	dis 62 1/2
R. B. & W., Flow	dis 62 1/2
R. B. & W., Stove	dis 62 1/2
R. B. & W., Stove	dis 62 1/2
Machine, according to size	dis 75 & 10
Bolt Ends, according to size	dis 75 & 10
Berry	\$ 2 1/4 & 10 1/4

Boring Machines.	
Without Augers, Upright	Angular.
Douglas	\$5.00
Snell's, Rice's Patent	\$5.50
Jennings	\$5.50
Other Machines	\$2.35
Phillips' Pat. with Augers 7.00	7.50

New Pins.	
Humason, Beckley & Co's	dis 60 & 10
Sargent & Co's	\$17 and \$18, dis 60 & 10
Peck Stow & W. Co.	dis 50 & 10 & 50 & 10 1/2

Braces.	
Backus, Nos. 110 to 114 and 81 to 83	dis 60 & 10
Backus, Nos. 6, 8, 12, 14	dis 60 & 10 1/2
Backus, Nos. 11, 13, 20, 22, 7, 9, 11	dis 70 & 10 1/2
Barber's, Nos. 10 to 16	dis 50
Barber's, Nos. 30 to 32	dis 50
Barber's, Nos. 40 to 63	dis 50 & 10
Barber's, Nos. 8, 10 and 12	dis 75 & 10
Barker's, Plated, Nos. 5, 10 and 12	dis 65 & 10
Sargent's Ratchet	dis 40 & 10 1/2
Sargent's Ratchet	dis 50 & 10
Ives' New Haven Novelty	dis 70 & 10
Ives' New Haven Ratchet	dis 60 & 10
Ives' Barber Ratchet	dis 60 & 10
Ives' Barber	dis 60 & 10
Ives' Spofford	dis 60 & 10
Common Ball, American	\$1.10 & \$1.15
Bartholomew's, Nos. 22, 27, 30	dis 60 & 10
Bartholomew's, Nos. 117, 118, 119	dis

Wrought (Steel)—	
Fast Joint Narrow.....	dis 70&10
Fast Joint Broad.....	dis 70&10
Fast Joint, Broad.....	dis 70&10
Loose Joint, Broad.....	dis 70&10
Table Butts, Back Flaps, &c.....	dis 70&10
Inside Blind, Regular.....	dis 70&10
Inside Blind, Light.....	dis 70&10
Loose Pin.....	dis 70&10
Bronzed Wrought Butts.....	dis 40&10 @ 40&10&5

Calipers—See Compasses.

Calks, Tee.....	dis 54&00
Gaulier.....	dis 54&00
Dewicks.....	dis 54&00

Can Openers.

Memenger's Comet.....	dis 25.00, dis 25
American.....	dis 25.00, dis 25
Duplex.....	dis 25.00, dis 25
Lyman's.....	dis 25.00, dis 25
No. 4, French.....	dis 25.00, dis 25
No. 5, Iron handle.....	dis 25.00, dis 25
Burke's.....	dis 25.00, dis 25
Sardine Openers.....	dis 25.00, dis 25
Star.....	dis 25.00, dis 25
Sprague, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	dis 25.00, dis 25
World's Best.....	dis 25.00, dis 25
Universal.....	dis 25.00, dis 25
Domestic.....	dis 25.00, dis 25
Champion.....	dis 25.00, dis 25

Cards.

Horse and Curry.....	dis 10&10 @ 10&10&10
Ottom.....	dis 10&10 @ 10&10&10
Wool.....	dis 10 @ 10&10

Carpet Stretchers.

Cast Steel, Polished.....	dis 25.00
Cast Iron, Steel Points.....	dis 25.00
Socket.....	dis 25.00
Ballard's.....	dis 25.00

Carpet Sweepers.

Steel No. 5.....	dis 17.00
Steel No. 6.....	dis 17.00
Steel No. 7.....	dis 17.00
Steel No. 8.....	dis 17.00
Steel No. 9.....	dis 17.00
Steel No. 10.....	dis 17.00
Steel No. 11.....	dis 17.00
Steel No. 12.....	dis 17.00
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Steel No. 14.....	dis 17.00
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Steel No. 94.....	dis 17.00
Steel No. 95.....	dis 17.00
Steel No. 96.....	dis 17.00
Steel No. 97.....	dis 17.00
Steel No. 98.....	dis 17.00
Steel No. 99.....	dis 17.00
Steel No. 100.....	dis 17.00

Cartridges—See Ammunition.

Bed.....	New list.....
Flute.....	Brass.....dis 55 @ 55&5
Shallow Socket.....	Others.....dis 60 @ 60&5
Deep Socket.....40&10
Yale Casters, list May, 1884.....	dis 30&10 40&40
Yale Gem.....	dis 30&10 60&25
Marlin's Patent (Phoenix).....	dis 45&12 @ 10
Payson's Anti-Friction.....	dis 50 @ 50&10
"Giant" Truck Casters.....	dis 10 @ 10&5
Stationary Truck Casters.....	dis 45&10
Cattle Leaders.....	
Humason, Beckley & Co.'s.....	dis 70
Sargent's.....	dis 60&10
Mockkies.....	dis 30
Peck Stow & W. Co.....	dis 50&10
Chains.....	
Trace, 6-10-2, exact sizes, \forall pair, \$1.03	dis 50&10
Trace, 6-10-2, exact sizes, \forall pair, .95	50&10&5
Trace, 7-10-2, exact sizes, \forall pair, 1.25	50&10&5
NOTE.—Traces, "Regular" sizes 8 net \forall pair less than exact.	
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884.....	
American Coll. 3-16 $\frac{1}{2}$ 6-10 $\frac{1}{2}$ 7-16 $\frac{1}{2}$ 8-16 $\frac{1}{2}$ 9-16 $\frac{1}{2}$ 10-16 $\frac{1}{2}$ 11-16 $\frac{1}{2}$ 12-16 $\frac{1}{2}$ 13-16 $\frac{1}{2}$ 14-16 $\frac{1}{2}$ 15-16 $\frac{1}{2}$ 16-16 $\frac{1}{2}$ 17-16 $\frac{1}{2}$ 18-16 $\frac{1}{2}$ 19-16 $\frac{1}{2}$ 20-16 $\frac{1}{2}$ 21-16 $\frac{1}{2}$ 22-16 $\frac{1}{2}$ 23-16 $\frac{1}{2}$ 24-16 $\frac{1}{2}$ 25-16 $\frac{1}{2}$ 26-16 $\frac{1}{2}$ 27-16 $\frac{1}{2}$ 28-16 $\frac{1}{2}$ 29-16 $\frac{1}{2}$ 30-16 $\frac{1}{2}$ 31-16 $\frac{1}{2}$ 32-16 $\frac{1}{2}$ 33-16 $\frac{1}{2}$ 34-16 $\frac{1}{2}$ 35-16 $\frac{1}{2}$ 36-16 $\frac{1}{2}$ 37-16 $\frac{1}{2}$ 38-16 $\frac{1}{2}$ 39-16 $\frac{1}{2}$ 40-16 $\frac{1}{2}$ 41-16 $\frac{1}{2}$ 42-16 $\frac{1}{2}$ 43-16 $\frac{1}{2}$ 44-16 $\frac{1}{2}$ 45-16 $\frac{1}{2}$ 46-16 $\frac{1}{2}$ 47-16 $\frac{1}{2}$ 48-16 $\frac{1}{2}$ 49-16 $\frac{1}{2}$ 50-16 $\frac{1}{2}$ 51-16 $\frac{1}{2}$ 52-16 $\frac{1}{2}$ 53-16 $\frac{1}{2}$ 54-16 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Patent Cable Laid Italian " " " " " "	7 1/2 @ \$15
India Cable Laid	7 1/2 @ \$15
Silver Lake, A Quality, White	50c dis 100x10x5
Silver Lake, A Quality, Drab	55c dis 100x10x5
Silver Lake, B Quality, White	50c dis 30x10x5
Silver Lake, B Quality, Drab	55c dis 30x10x5
Silver Lake, C Quality, White (only)	37c @ 35c
Sylvan Spring, Extra Braided, White	50c dis 35x10
Sylvan Spring, Extra Braided, Drab	50c
Semper Idem	50c
Egyptian, Extra Hemp, Braided	55c
Samson, Braided, White Cotton	50c dis 30 @ 30x2 1/2
Samson, Braided, Drab Cotton	55c dis 30 @ 30x2 1/2
Samson, Braided Italian Hemp	55c dis 30 @ 30x2 1/2
Samson Braided Linen	90c dis 30 @ 30x2 1/2
Sash Locks.	
Clark's No. 1, \$10.00; No. 2, \$8.00 @ gross	dis 33 1/2
Ferguson's	dis 33 1/2
Morris and Triumph, list Aug. 16, 1888	dis 60x2 1/2
Victor	60x10x2 1/2
Walkers	dis 10
Attwell Mfg. Co.	dis 25
Reading	dis 60x2 1/2 @ 60x10x10
Hammill's Window Springs	dis 40
Common Sense, Jan d. Cop'd and Br'nd.	@ gross \$1.00
Common Sense, Nickel Plated	@ gross \$1.00
Universal	dis 30
Kempshall's Gravity	dis 30
Kempshall's Model	dis 60x2 1/2
Corbett's Safety, list February 15, 1888	dis 70
Patent Patent	dis 60 @ 60x10
Hugrulin's New and Improved Adjustable Sash Balances, list Jan. 5, 1887	dis 25x2 1/2
Hugrulin's New Sash Locks, list Jan. 5, '87	dis 25x2 1/2
Sioddard "Practical"	dis 30
Ives Patent	dis 30
Lecher's No. 100 & 110 @ gross 85; 105, \$10.	dis 30x10
Navis, Bronze, Barnes Wfg. Co.	dis 50
Champion Safety, list March 1, 1888	dis 55x55x2 1/2
Security	dis 70x3
Sash Weights.	
Solid Eyes	@ ton 22 1/2
Sausage Stuffers or Fillers.	
Miles' "Challenge"	@ dos 30, dis 50x60x2 1/2
Perry's, @ dos No. 1, \$15; No. 2, \$20, dis 50x60x2 1/2	
Draw Out No. 4	each, \$30.00, dis 30
Enterprise Mfg Co	dis 30x10 @ 30
Enterprise	dis 40x10
Saws.	
Diston's Circular	dis 45x45x2 1/2
Diston's Cross Cuts, dis 45x45x2 1/2	times given by Diston's Hand
Attkins' Circular	dis 50
Attkins' Silver Steel Diamond X Cuts	@ foot 70
Attkins' Silver Steel Dexter X Cuts	@ foot 50
Attkins' Special Steel Diamond X Cuts	@ foot 30
Attkins' Champion and Electric Tooth X Cuts	@ foot 27 @ 25c
Attkins' Hollow Back X Cuts	@ foot 18
Attkins' Shingle, Mulay, Craig, &c.	dis 30x25 @ 30x10
W. M. & C. Champion X Cuts, Regular	@ foot 34 @ 30c
W. M. & C. X Cuts, Thin Back	@ foot 27 @ 25c
Peace Circular and Mill	dis 45x10
Peace Hand Panel and Rip	dis 30x10 @ 30x10x10
Peace Cross Cuts, Standard	@ foot 15
Peace Cross Cuts, Thin and Mill	@ foot 25 @ 25c
Richardson's X-Cuts, No. 1, 30c; No. 2, 37c; No. 3, 34c	
Griffin's Hack Saws, complete	dis 40x10 @ 50
Griffin's Hack Saw, Blades only	dis 40x10 @ 50
Star Hack Saws and Blades	dis 25
Diamond Hack Saws and Blades	dis 25
Eureka and Crescent	dis 25
Saw Frames.	
White Vermont	@ gross \$10
Red, Polished, and Varnished	@ dos \$1.50, dis 25
Saw Sets.	
Stillman's Genuine	@ dos \$5.00 and \$7.75, dis 40x2 1/2
Stillman's Imita.	@ dos \$2.50 and \$5.00, dis 40x2 1/2
Common Lever	@ dos \$2.00, dis 40x2 1/2
Morrill's No. 1, \$15.00; No. 2 & 3, \$8.00	dis 40x10 @ 50c
Leitch No. 0, \$3.00; No. 1, \$15.00; dis 15 @ 30	
Noah's	dis 30x10 @ 30x10x10
Hammer, Hotchkiss	\$5.50, dis 10
Hammer, Bemis & Call Co.'s new Patent	dis 30x25
Bemis & Call Co.'s Lever and Spring Hammer	dis 30
Bemis & Call Co.'s Plate	dis 10
Alken's Genuine	\$12.00, dis 50x10
Alken's Imitation	\$7.00, dis 50x2 1/2
Hart's Patent Lever	dis 30
Diston's, Star, 30, No. 15, \$5.50, dis 30x10 @ 30x10x10	
Atkins' Lever	per dos No. 1, \$5.00; No. 2, \$7.50
Atkins' Criterion	per dos No. 1, \$5.00; No. 2, \$7.50
Croissant & Keller, No. 1, \$15.00; No. 2, \$24.00	dis 40x10
Saw Tees.	
Atkins Perfection	\$15.00; Excelsior \$6.00 @ dos
Scales.	
Hatch, Counter, No. 171, good quality	@ dos \$21
Hatch, Tea, No. 161	@ dos \$2.75 @ \$7.00
Union Platform, Plain	\$25.00 @ 30.00
Union Platform, Striped	\$25.00 @ 30.00
Chatillon's Grocers' Trip Scales	dis 50
Chatillon's Eureka	dis 25
Chatillon's Favorite	dis 40
Family, Turnball's	dis 30 @ 30x10
Scale Beams.	
Scale Beams, list of Jan. 12, 23, dis 50x10 @ 60x10x2 1/2	
Chatillon's No. 1	dis 45
Chatillon's No. 2	dis 50
Scrapers.	
Adjustable Box Scraper (B. R. & L. Co.)	\$5.50, dis 30x10
Box, 1 Handle	@ dos \$4.00, dis 10
Box, 2 Handle	@ dos \$5.00, dis 10
Defiance Box and Ship	dis 50x10 @ 50
Foot, 1 Handle	@ dos \$3.50, dis 10
Ship, Providence Tool Co.	dis 10
Screen Window and Door Frames.	
Porter's Pat. Window and Door Frame	dis 33 1/2 @ 30
Stearns' Frames and Corners	dis 25 @ 33 1/2 @ 30
Screw Drivers.	
Durand Mfg Co.	dis 30x10x10
Diston's	dis 45x10
Diston's Patent Excelsior	dis 45x10
Buck Bros	dis 30
Stanley R. & L. Co.'s Varnished Handles	dis 30x10
Stanley R. & L. Co.'s Black Handles	dis 30x10
Sargent & Co.'s No. 1 Forged Blade	dis 60x10x10
Sargent & Co.'s Nos. 20, 40 and 60	dis 60x10x10
Knapp & Cowles' No. 1	dis 60x20 @ 70
Knapp & Cowles' No. 1 Extra	dis 60 @ 60x10
Knapp & Cowles' No. 00 & 1	dis 50x25 @ 50x10x25
Stearns'	dis 25x25 @ 30
Gay & Parsons	dis 35
Champion	dis 25x10
Champion	dis 30 @ 35x45
Crawford's Adjustable	dis 30
Elirich's Socket and Ratchet	dis 25 @ 35x10
Allard's Spiral, new list	dis 30
Koib's Common Sense	@ dos 30, dis 35x10

Syracuse Screw-Drive Bits	.....	dls 80 & 80½¢
Screw Driver Bits	.....	¢ dos, 60¢ & 75¢
Screw Drivers	.....	¢ dos, 60¢ & 75¢
Tray's Hdl. Hdle. Sets, No. 3, 112.	.....	dls 25 & 25 10 ¢
P. D. & Co.'s, all Steel	.....	dls 50 ¢
Screws		
Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887	.....
Flat Head Iron	.....	dls 70 ¢
Round Head Iron	.....	dls 65 ¢
Round Head Brass	.....	dls 65 ¢
Round Head Brass	.....	dls 65 ¢
Round Head Bronze	.....	dls 65 ¢
Flat Head Bronze	.....	dls 60 ¢
Machines		
Flat Head, Iron	.....	dls 55 ¢
Round Head, Iron	.....	dls 60 ¢
Bench and Hand—		
Bench, Wood	.....	dls 55&10 @ 55&10&10 ¢
Bench, Wood, Beech	.....	¢ dos \$2.25
Bench, Wood, Hickory	.....	dls 20&10 ¢
Hand, Wood	.....	dls 25&10 @ 25&10&5 ¢
Lag, Blunt Point	.....	dls 75 ¢ & 75 10 ¢
Cochan and Lag, Gimlet Point	.....	dls 75 ¢
Bed, Iron, Sash	.....	dls 60 ¢
Band Hall, Humason, Beckley & Co.'s	.....	dls 70&10@75 ¢
Hand Rail, Am. Screw Co.	.....	dls 75 ¢
Jack Screws, Millers Falls list	.....	dls 50 ¢ & 50&5 ¢
Jack Screws, P. S. & W	.....	dls 35 ¢
Jack Screws, Sargent	.....	dls 60&10 @ 60&10&5 ¢
Jack Screws, Stevens	.....	dls 40 ¢ & 40&10 ¢
Screws		
List complete, \$10.00	.....	dls 25 ¢
Rogers complete, \$4.00	.....	dls 25 ¢
Barnes' Builders' and Cabinet Makers', \$15.	.....	dls 25 ¢
Scythe Sheaths	.....	dls 60&2 ¢
Shears		
American (Cast) Iron	.....	dls 75&10 @ 75&10&5 ¢
Fanning, J. & Co., Pressing Hooks and Shears	.....	dls 30 ¢
Trimmer's Lam. Trimmers	.....	¢ dos \$2.75
Trimmer's	.....	dls 30&2 ¢
Seymour's List, Dec. 1881 dis	60&10&10 @ 60&10&10&5 ¢	
Heinrich's List, Dec. 1881, dis	60&10&10 @ 60&10&10&5 ¢	
Heinrich's Tailor's Shears	.....	dls 85&4 ¢
First quality C. S. Trimmers	.....	dls 80&50&10 ¢
Second quality "C. S. Trimmers	.....	dls 50&10 @ 50&10 ¢
Diamond Cast Shears	.....	dls 10&10 ¢
Second Cast Shears	.....	dls 10 ¢
Chipper	.....	dls 10&10 ¢
Victor Cast Shears	.....	dls 75&10 @ 75&10&5 ¢
Howe Bros. & Rubert, Solid Forged Steel	.....	dls 40 ¢
Cleveland Machine Co., Solid Steel Forged	.....	dls 70 ¢
Glauss Shear Co., Nipped	.....	dls 70 ¢
Clauss & Co., Jacksoned, same list	.....	dls 60 ¢
Shavees		
Sliding Door—		
M. W. & Co., list July, 1888	.....	dls 50&10 @ 50&25 ¢
E. & E. list Dec. 18, 1885	.....	dls 55&25 ¢
Corbin's list	.....	dls 50&10&2 ¢
Patent Roller	.....	dls 60&10&5 ¢
Hendall & Hold, Herald's	.....	dls 75 ¢
Moore's Anti-Friction, list Dec. 18, 1885	.....	dls 60&2 ¢
Moore's Anti-Friction	.....	dls 60 ¢
Sliding Window—		
E. & E. list Dec. 18, 1885	.....	dls 60&10&2 ¢
Sargent's list	.....	dls 60&10 ¢
Reading list	.....	dls 60&10&10 ¢
Shingles		
J. J. White	.....	dls 30&5 ¢
Albertson Mfg. Co.	.....	dls 25 ¢
Shoes, Horse, Mule, &c.		
Horse—		
Burden's, Perkins, Phoenix, at factory	.....	\$4.00
Mule—Add \$1 ¢ per kg to above prices.	.....
Ox, Wrought—		
Iron	.....	¢ dos 99 ¢
1000 a lot	.....	¢ dos 99 ¢
500 a lots	.....	¢ dos 106 ¢
Shot.—Eastern prices, 2¢ off. cash, 5 days.	.....
Drop, ¢ bag, 25 ¢	.....	Market unsettled.
Drop, ¢ bag, 5 ¢	.....	See Trade Report.
Buck and Chilled, 1/2 ¢ bag	.....
Buck Shot, 5 ¢ bag	.....
Shovels and Spades		
Amos' Shovels, Spades, &c., list Nov. 1, 1885	.....	dls 30 ¢
Nott.—Jobbers frequently give 5 ¢ or 7¼ ¢ extra on above.	.....
Griffith's Black Iron	.....	dls 50&10 ¢
Griffith's C. S.	.....	dls 60 ¢ & 60&10 ¢
Griffin's & Sons, R. & G. Goods	.....	dls 20 ¢
Griffin's (Sanford Fork & Tool Co.)	.....	dls 20 ¢
St. Louis Shoe Co.	.....	dls 20 ¢ & 20&7¼ ¢
Hussey, Bluns & Co.	.....	dls 15 ¢ & 25 ¢
Hubbard & Co.	.....	dls 30 @ 20&7¼ ¢
Lehigh Mfg. Co.	.....	dls 60&10 ¢
Payne Pettibone & Son, list January, 1886	.....	dls 30 ¢
Birmingham's "Lion's Patent"	.....	dls 30&10 @ 40 ¢
Black Iron	.....	dls 60&10 ¢
Rowland's Black Iron	.....	dls 60&10 ¢
Rowland's Steel	.....	dls 60&5 ¢ & 60&10 ¢
Shovels and Tongs		
Iron Head	.....	dls 60&10 @ 60&10&5 ¢
Brass Head	.....	dls 60&10&10 ¢
Skeins, Thimble		
Western list	.....	dls 75&5 @ 75&10 ¢
Colburn & Vt. Steel list Nov. 1, 1887	.....	dls 20 ¢
Conbrookland Iron Co	.....	dls 50&10 ¢
Utica P. S. T. Skeins	.....	dls 30 ¢
Utica Turned and Fitted	.....	dls 65 ¢
Stoves		
Buffalo Metallic S. B. & Co., new list	.....	dls 50&25&10 ¢
Barber Flour Sifters	.....	¢ dos \$3.00
Smith's "Lion's Patent"	.....	¢ dos 2.00
Adjustable Milk Strainer	.....	¢ dos 2.00
Smith's Adjustable F. & C. Strainer	.....	¢ dos \$1.75
Shoes, Wooden Rim—		
Meek 18, Nested, ¢ dos	.....	70¢ 90¢
Meek 20, Nested, ¢ dos	.....	85¢ \$1.00
Meek 24, Nested, ¢ dos	.....	\$1.00 1.10
Slates.—School, by case	.....	dls 50&10 ¢
Sungas, Hinges, &c.		
Anchor (I. & Mfg. Co.)	.....	dls 65 ¢
Anchor (F. & Bristol)	.....	dls 50&10 ¢
Hotchkiss	.....	dls 10 ¢
Andrews	.....	dls 50 ¢
Sargent's Patent Guarded	.....	dls 70&10&10 ¢
German, new list	.....	dls 40&10 ¢
Covert	.....	dls 50&2 ¢
Covert, New Patent	.....	dls 50&2&2 ¢
Covert New P. S.	.....	dls 50&5 ¢
Covert Spring	.....	dls 50&10&10 ¢
Soldering Irons		
Covert's Adjustable, list Jan. 1, 1886	.....	dls 55&2 ¢
Spike Shaves.—Iron		
Wood	.....	dls 45 ¢
Bailey's (Stanley E. & L. Co.)	.....	dls 40&10 ¢
Stearns	.....	dls 30&10 @ 30 ¢
Stamps		
Bonney's Trimmers	.....	¢ dos \$10.00, dls 50 ¢
Stearns	.....	dls 20&10 ¢
Ives' No. 1, \$14.00; No. 2, \$12.00 ¢ dos	.....	dls 55&10 ¢
Douglas	.....	¢ dos \$2.00, dls 30 ¢
Spears and Forks		
Stamp Press		
Central, Central Stamping Co.'s list	.....	dls 70&10 ¢
Solid Table and Tea, Central Stamping Company's list	.....	dls 70&10 ¢
Buffalo S. B. & Co.	.....	dls 39¢&2 ¢
Miter-Prised—4 mo. or 5 ¢ cash 31 days.	.....
Morden Brit. Co., Rogers	.....	dls 50 ¢
Roberts & Rogers	.....	dls 50 ¢
Reed & Bro	.....	dls 50 ¢
Reed & Barton	.....	dls 50 ¢
Wm. Rogers Mfg. Co.	.....	dls 50&10 @ 50&10&5 ¢
Wm. Rogers, list, Miller & Co.	.....	dls 50&10 ¢

Collins & Edwards Silver Co. dis 50¢10 @ 50¢10.45
 H. & K. Silver Co. Mexican Silver..... dis 50¢5
 J. & S. Silver Co. Durham Silver..... dis 50¢5
 German Silver, Hall & Elson..... dis 50¢5
 German Silver, Hall & Elson..... dis 50¢5 & 5¢ cash
 Nickel Silver..... dis 50¢5 @ 50¢10.25
 Britannia..... dis 40¢
 Boardman's Flat Ware..... dis 50¢10
 Boardman's Nickel Silver..... dis 50¢5
 Boardman's Brit'nia Spoons, case lots..... dis 50¢
 Springs.
 Elliptic, Concord, Platform and Half Scroll..... dis 60¢ @ 60¢5
 Cliff & Bolster Springs..... dis 25¢
 Squares.
 Steel and Iron..... } dis 75¢ @ 80¢
 Nickel Plated..... }
 Try Square and T Bevels..... dis 60¢10.10 @ 70¢
 Diston's Try Square and T Bevels..... dis 45¢10
 Winterbottom's Try and Witer..... dis 80¢10
 Starrett's Micrometer Caliper Squares..... dis 25¢
 Staples.
 Fence Staples, Galvanized } Same price as Barb Wire.
 Fence Staples, Plain } See Trade Report.
 dis 40¢10.20 @ 50¢
 Stocks and Dies.
 Blacksmith's, Waterford Goods..... dis 30¢5 @ 30¢10
 Lightning Screw Plate..... dis 25¢ @ 30¢
 Reece's New Screw Plates..... dis 33¢ @ 33¢.45
 Stone.
 Hindstone No. 1, 8¢; Axe, 5¢; Slips No. 1, 5¢.
 Washita Stone, Extra..... \$ 2.1 @ 2.25
 Washita Stone, No. 1..... \$ 1.15 @ 1.25
 Washita Stone, No. 2..... \$ 1.11 @ 1.25
 Washita Slips, No. 1 Extra..... \$.40 @ 42¢
 Washita Slips, No. 1..... \$.30 @ 32¢
 Arkansas Stone, No. 1, 4 to 5 in..... \$.13.50
 Arkansas Stone, No. 1, 6 to 9 in..... \$.17.75
 Turkey Oil Stone..... \$ 2.00 @ 2.10
 Turkey Slips..... \$ 1.00 @ 1.50
 Lake Superior, Chase..... \$ 1.15 @ 1.25
 Lake Superior Slips, Chase..... \$.31 @ 32¢
 Seneca Stone, Red Paper Brand, \$ 2..... 18¢ @ 20¢
 Seneca Stone, Hg. Rounds, \$ 2..... 20¢ @ 25¢
 Seneca Stone, Small, \$ 2..... 22¢.00
 Seneca Fellows—Joseph Dixon..... \$ 2.50 @ 2.60
 Gem..... \$ 2.50 @ 2.60
 Gold Medal..... \$ 2.50 @ 2.60
 "Mirror"..... \$ 2.50 @ 2.60
 Lustr..... \$ 2.50 @ 2.60
 Ruby..... \$ 2.50 @ 2.60
 Blasting Gun, 5 gro. lots..... \$ 2.50 @ 2.60
 Boynton's Noon Day, \$ 2 gro..... \$ 2.50 @ 2.60
 Parlor Fire Stove Enamel..... \$ 2.50 @ 2.60
 Yates' Liquid, 2 8 5 10 gal. cans, \$ 2.50 @ 2.60
 Yates Standard Paste Polish 10-lb cans, per lb., 15¢
 Jet Black..... \$ 2.50 @ 2.60
 Firesteel..... \$ 2.50 @ 2.60
 Diamond O. K. Enamel..... \$ 2.50 @ 2.60
 Bonnell's Liquid Stove Polish..... \$ 2.50 @ 2.60
 Bonnell's Paste Stove Polish..... \$ 2.50 @ 2.60
Tacks, Brads, &c.
 List Jan. 2, 1888.
 American Iron Carpet Tacks..... dis 72¢ @ 10¢2.5
 Steel Carpet Tacks..... dis 72¢ @ 10¢2.5
 American Iron Cut Tacks..... dis 72¢ @ 10¢2.5
 American Iron Cut Tacks..... dis 72¢ @ 10¢2.5
 Swedes Iron Tacks..... dis 67¢ @ 10¢2.5
 Swedes Iron Upholsterers' Tacks..... dis 67¢ @ 10¢2.5
 Tinned Swedes Iron Tacks..... dis 67¢ @ 10¢2.5
 Tinned Swedes Iron Upholsterers' Tacks..... dis 67¢ @ 10¢2.5
 Gimp and Lace Tacks..... dis 67¢ @ 10¢2.5
 Swedes Iron Trimmers' Tacks..... dis 67¢ @ 10¢2.5
 Swedes Iron Miners' Tacks..... dis 67¢ @ 10¢2.5
 Swedes Iron Bill Posters' or Railroad Tacks..... dis 67¢ @ 10¢2.5
 Swedes Steel Tacks, all kinds (Swedes iron price list)..... dis 72¢ @ 10¢2.5
 Copper Tacks..... dis 35¢ @ 10¢2.5
 Copper Finishing Trunk and Clout Nails..... dis 35¢ @ 10¢2.5
 Finishing Nails..... dis 60¢ @ 10¢2.5
 Trunk and Clout Nails..... dis 60¢ @ 10¢2.5
 Tinned Trunk and Clout Nails..... dis 60¢ @ 10¢2.5
 Basket Nails..... dis 60¢ @ 10¢2.5
 Common and Patent Brads..... dis 60¢ @ 10¢2.5
 Chair Nails..... dis 60¢ @ 10¢2.5
 Zinc Glaziers' Points..... dis 45¢ @ 10¢2.5
 Cigar Box Nails..... dis 45¢ @ 10¢2.5
 Picture-Frame Points..... dis 45¢ @ 10¢2.5
 Looking-Glass Tacks..... dis 45¢ @ 10¢2.5
 Leathered Carpet Tacks..... dis 45¢ @ 10¢2.5
 Shoe Finders..... List Jan. 2, 1888, dis 10¢ @ 10¢2.5
 Lining and Saddle Nails, List Jan. 1, 1888.
 Silvered..... dis 30¢ @ 10¢10
 Japanned..... dis 20¢ @ 10¢10
 Double-pointed Tacks..... 85¢
 Wire Carpet Nails..... dis 60¢ @ 10
 Wire Brads and Nails..... See Nails, Wire
 Tap Borers—Common and B.C..... dis 30¢ @ 10
 Tap Borers—Common and B.C..... dis 30¢ @ 10
 Enterprise Mfg. Co..... dis 20¢ @ 10
 Clark's..... dis 33¢ @ 35¢
 Tapes, Measuring—American..... dis 25¢ @ 10
 Spring..... dis 40¢
 Cheesman's..... Regular list dis 25¢ @ 50¢
 Tinsmiths' Pattern, Tin Case..... dis 50¢ @ 50¢10
 Thimble Skeins—See Skeins
 Ties, Bale—Steel Wire, Stan'd list, dis 50¢ @ 10¢2.5
 Tinners' Shears, &c..... dis 30¢ @ 25¢
 Shears and Snips (P. S. & W.)..... dis 30¢ @ 25¢
 Punches—See Punches
 Snips, J. Mallinson & Co..... dis 33¢ @ 35¢
 Stamped, Japanned & Piced, list Jan. 20, 1877.
 Tire Benders, Upsetters, &c..... dis 70¢ @ 10¢2.5
 Stoddard's Lightning Fire Upsetters..... dis 15¢
 Detroit Perfected Tire Bender..... dis 15¢
 Tobacco Cutters.
 Enterprise Mfg. Co. (Champion)..... dis 20¢ @ 10¢2.5
 All Iron..... \$ 25.00 @ 25.25
 Nashua Lock Co.'s..... \$ 25.00 @ 25.25
 Wilson's..... \$ 25.00 @ 25.25
 Sargent's..... \$ 25.00 @ 25.25
 Acme..... \$ 25.00 @ 25.25
 Transm Lifters.
 Wagon Patterns on Bronzed..... dis 50¢
 Reiber's Bronzed Iron Rods list Jan. 1, 1887, dis 60¢5
 Reiber's Real Bronze or Nickel Plate, list Jan. 1, 1887..... dis 60¢5
 Excelsior..... dis 50¢ @ 10¢2.5
 Shaw's..... dis 50¢ @ 10
 Payson's Universal..... dis 40¢ @ 40¢10
 Crown and Star..... dis 50¢
 Traps.
 Game—
 Newhouse..... dis 35¢ @ 40¢5
 Oneida Pattern..... dis 70¢ @ 70¢5
 Game, Blake's Patent..... dis 40¢ @ 10¢2.5
 Mice and Rat.
 New York Choker..... \$ 25.00 @ 25.25
 Mouse, Round Wire..... \$ 25.00 @ 25.25
 Mouse, Cage, Wire..... \$ 25.00 @ 25.25
 Mouse, Catch—em-alive..... \$ 25.00 @ 25.25

Extra 10¢ @ 10¢2.5 generally given.

Mouse, "Bonanza" \$ gross \$10 25
Mouse, Delusion \$ gross \$10 00, dis 15
Ideal, "Decoy" \$ gross \$10 00, dis 10
Cyclone \$ gross \$5 35
Hotchkiss Metallic Mouse, 5-hole traps \$ dos 90¢
In full cases \$ dos 75¢
Trowels.—Lothrop's Brick and Plastering dis 95¢
Fred's Brick and Plastering dis 15¢
Dick and Plastering dis 25 ¢ 10¢
Pease's Plastering dis 35¢
Clement & Maynard's dis 30¢
Rose's Brick dis 15 ¢ 30¢
Brade's Brick dis 25¢
Worrall's Brick and Plastering dis 30¢
Garden dis 70¢
Triers, Butter and Cheese dis 35¢
Tubs, Wash Houses, &c.
B. & L. Block Co.'s list, 1883 dis 40¢
Tubes, Boiler.—See Pipe
Twine.
No. 9, Flax Twine, ¼ and ½ Balls 20¢ 80¢
No. 12, " " ¼ and ½ " " 11¢ 35¢
No. 15, " " ¼ and ½ " " 12¢ 35¢
No. 24, " " ¼ and ½ " " 18¢ 25¢
No. 36, " " ¼ and ½ " " 10¢ 27¢
No. 264, Matras, ¼ and ½ " " 15 ¢ 50¢
Chalk Line, Cotton, ¼ Balls 25¢
Mason Line, Linen, 50¢
3-Ply Hemp, ¼ and ½ Balls (Spring Twine) 11¢ 45¢
3-Ply Hemp, ¼ Balls 15 ¢ 11¢
3-Ply Hemp, 1½ Balls 15 ¢ 11¢
Cotton Wrapping, 5 Balls to doz 15 ¢ 10¢
2, 3, 4 and 5-Ply Jute, ¼ Balls 10¢
Wool 6¢ 6¢
Paper 12¢ 14¢
Cotton Mops—6, 9, 12 and 15 B to doz 15¢
Vases.
Solid Box dis 60 ¢ 60 25 ¢
Washers & Norris Double Screw. dis 15 10 10
Stephens' dis 25 ¢ 30 ¢
Parkers' dis 30 ¢ 35 ¢
Wilson's dis 55 ¢
Howard's dis 45 ¢
Bonney's dis 40 10 10
Millers Falls dis 50 ¢ 40 10
Treadwell dis 40 10
Merrill's dis 15 30 30
Sargent's dis 60 10 10
Backus and Union dis 40 ¢
Double Screw Loe dis 15 10 ¢
Prentiss' dis 30 25 ¢ 35 ¢
Simpson's Adjustable dis 40 ¢
Saws.
Bonney's, Nos. 2 & 3, 2 ft \$ dos \$15.00, dis 4 10 ¢
Stearns' dis \$34.10 ¢ 33 10 10 10
Stearns' Silent Saw Vices dis 35 ¢ 35 ¢
Sargent's dis 60 10 10
Hopkins' \$ dos \$17.50 dis 10 ¢
Reading dis 40 10 10
Wentworth \$ gro, \$43.00
Comstock Hand Vise dis 30 ¢
Cowell Hand Vices dis 30 ¢
Bauer's Pipe Vices dis 10 ¢
Wagon Boxes.
Per lb \$ dos \$4.00, dis 25 ¢
Washer Cutters.
Smith's Patent \$ dos \$12.00, dis 40 10 10 10
Johnson's \$ dos \$1.00, dis 35 ¢
Farnham \$ dos \$1.14 Jap'd, \$16, dis 45 ¢
Appleton's \$ dos \$16.00, dis 60 10 10
Bonney's dis 30 10 10
Washers.
size ¼ 5-16 ¾ ¼ ¼ ¼ ¼ ¼
Washers 7 6 ¼ 4 ¼ 3 ¼ 3 ¼ 3 ¼
In lots less than 200 B, ¾ B, add ¼¢, 5-B boxes 1¢ to
Wedges.—Iron. \$ dos \$3 45
Steel \$ dos 4 ¢
Well Buckets, Galvanized.
Hill's \$ dos .12 qt. \$4.25; 14 qt. \$5.25
Iron Clad \$ dos, 14 qt. \$4.50 ¢ \$4.50
Whiting's Flat Iron Band \$ dos \$4.25 ¢ \$4.50
Whiting's Iron Top \$ dos \$4.00 ¢ \$3.25
Well Wheels—3 in., \$2.25; 10 in., \$2.70; 18 in.,
\$3.25
Wire.
Iron.
Market, Br. & Ann., Nos. 0 to 18 dis 70 10 27 5
Market, Coppered, Nos. 0 to 18 dis 70 10 27 5
Market, Galv'd, Nos. 0 to 18 dis 65 25 ¢
Market, Tinned, Tinned list Nos. 0 to 18 dis 67 ¼
Stone, Br. & Ann'd, Nos. 16 to 18 dis 72 ¼ 72 ¼ 5
Stone, Bright & Ann'd, Nos. 19 to 26 dis 75 75 25 ¢
Stone, Br. & Ann'd, Nos. 27 to 36 dis 76 10 25 ¢
Stone, Tinned, Tinned list, Nos. 18 to 36, dis 70 10 25 ¢
Tinned Broom Wire, Nos. 18 to 24, dis 70 10 25 ¢
Galvanized Fence, Nos. 8 & 9 dis 75
Galvanized Fence, Nos. 8 & 9 dis 75
Annealed Grape, Nos. 10 to 14 dis 75
Brass, list, Jan. 18, '84 dis 15 ¢ 30 ¢
Copper, list Jan. 18, 1884 dis 20 ¢ 25 ¢
Barb Fence See Trade Report
Wire on Spools dis 65 ¢
Mailing's Steel and Tinned Wire on Spools dis 40 10 10
Mailing's Galv'd and Copper Wire on Spools dis 30 ¢
Galv'd Steel Wire dis 50 ¢
Stub's Steel Wire \$0.00 to 2, dis 30 ¢
Steel Music Wire, Nos. 12 to 30 55 ¢
Picture Wire dis 60 10 10
Barb Wire Safety Guards \$ 1000 90.00, dis 25 ¢
Wire Clothes Lines
Wire Cloth, Netting &c
Paint Screen Cloth, No. 24, ¼ 100 sq ft \$1.00
Painted Screen Cloth, No. 33, ¼ 100 sq ft \$2.00
Galvanized Wire Netting dis 70 10 20 ¢ 75 ¢
Wire Goods.—See Bright Wire Goods.
Wire Rope.—List May 1, 1886. dis 32 ¼
Wrenches.—American Adjustable. dis 40 10 10
Baxter's "Diamond" " " dis 40 10 10
Coe's "Diamond" " " dis 40 10 10
Coe's Genuine dis 55 25 ¢
Coe's "Mechanics" dis 55 10 25 ¢
Girard Standard dis 70 10
Machinists, Sterling Wrench Co. dis 70 10
Lamson & Sessions' Engineers' dis 60 10
Lamson & Sessions' Standard dis 70 10
Girard Agricultural dis 30 ¢ 30 25 ¢
Lamson & Sessions' Agricultural
Sterling Wrought
Bemis & Call's Patent Combination dis 25 ¢
Bemis & Call's Merrick's Pattern dis 35 ¢
Bemis & Call's Bridge Pattern dis 40 10
Bemis & Call's Standard or Gas Pipe dis 40 25 ¢
Bemis & Call's No. 5 Pipe dis 35 25 ¢
Alken's Pocket (Bright) \$ 60, dis 60 10
The Favorite Pocket (Bright) \$ dos \$4.00, dis 40 ¢
Webster's Patent Combination dis 25 ¢
Boardman's dis 25 ¢
Always Ready dis 25 ¢
Donohue's Engineer dis 50 ¢
Acme, Bright dis 60 25 ¢
Acme, Nickel dis 60 25 ¢
Walker's dis 55 25 ¢
Diamond dis 4 ¢
Diamond Patent Steel dis 4 ¢
Wrinklers
List Jan. 10, 1886, \$2.50 off.
Wrought Goods.
Staples Hooks, &c., 12 Jan. 12, '87, dis 50 25 30 50 25 ¢

THE IRON AGE

THURSDAY, NOVEMBER 1, 1888.

The Dean Blowing Engine.

We show on this page elevations and sections of a direct-acting blowing engine built by the Dean Bros. Steam Pump Works, of Indianapolis, Ind. It was specially designed for agitating oils, acids and chemical preparations and has been

being run at a high speed. Ten sizes are made, with steam cylinders ranging from 4 to 12 inches in diameter and air cylinders from 5½ to 16 inches, the strokes varying from 7 to 18 inches. The engines are also claimed to make superior air pumps for condensing engines, working efficiently on either surface or jet con-

Locomotive Draft Appliances.

The possibility of making the exhaust steam from the locomotive perform the work of creating the necessary draft and yet pass out under pressure light enough to prevent obstruction to the piston during the return stroke is at present receiving a

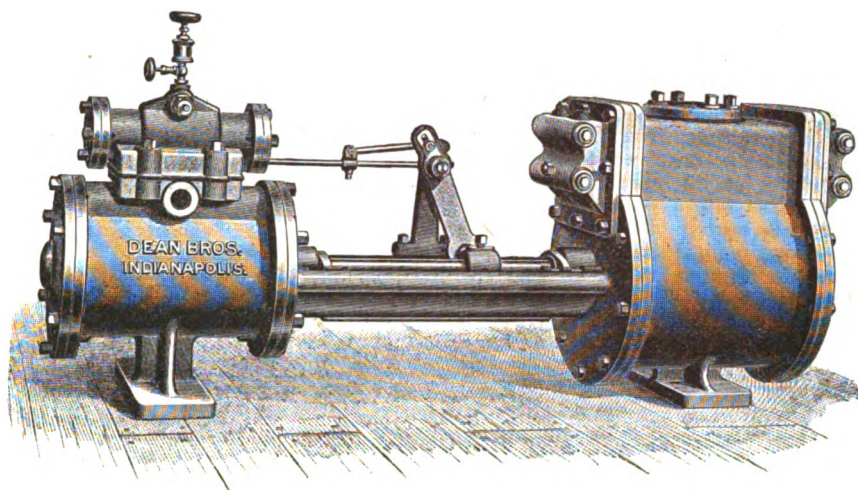


Fig. 1.—General View.

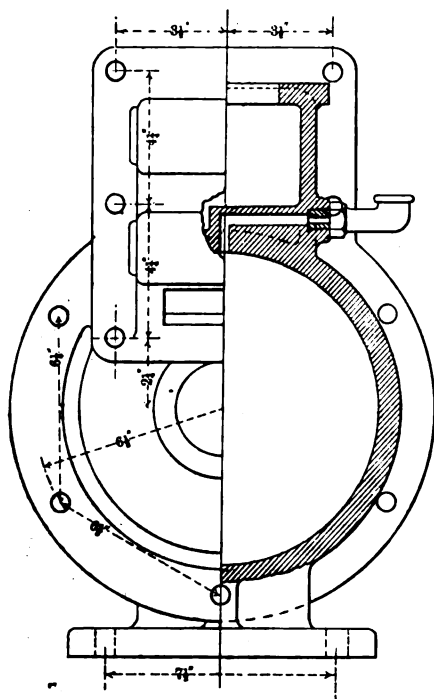


Fig. 2.—Vertical Section and Elevation of Air Cylinder.

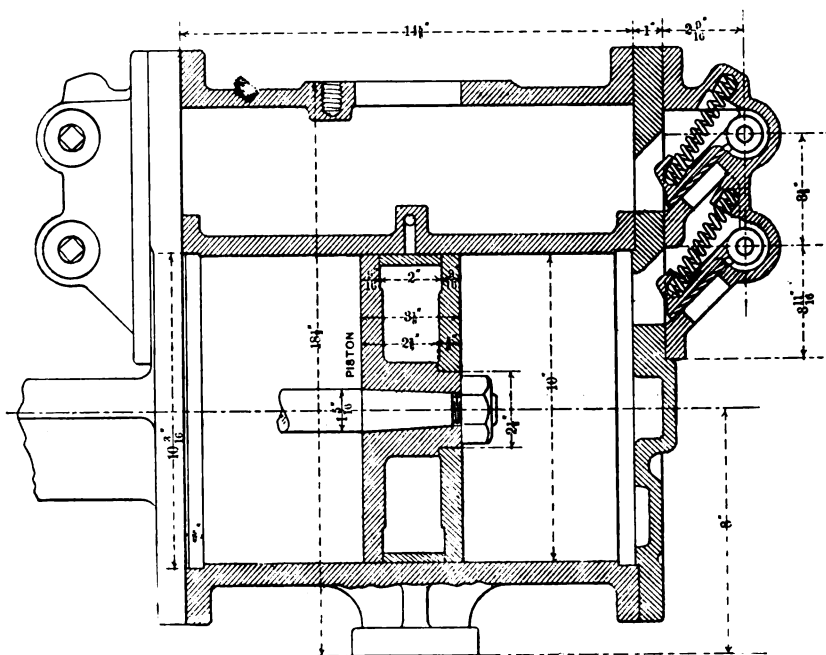


Fig. 3.—Longitudinal Section.

DIRECT-ACTING BLOWING ENGINE, BUILT BY THE DEAN BROS. STEAM PUMP WORKS, INDIANAPOLIS, IND

extensively used in cotton-seed oil works, where it has given excellent satisfaction. The stroke is adjustable, permitting the running of the air piston close to the cylinder head, and the space around the valves is very small, thereby expelling the greatest quantity of air possible from the cylinder at each stroke. The lubrication of the air cylinder is secured by delivering the oil directly into the cylinder over the crank of piston. The engine is capable of

densers. Figs. 2 and 3 clearly show the principal features of the design.

Lately three cars came into the south yards, at Grand Rapids, Mich., bearing the official placard of the Custom House Department and consigned to the Gunn Hardware Company. These cars are the first that have arrived under such circumstances, and contain plate tin direct from the manufacturers, in Wales.

great deal of attention from railroad men. In a recent article on the subject the *National Car and Locomotive Builder* remarks:

The ordinary combination of low double nozzles, lift pipe in the smoke-box, large cylindrical smoke-stack and diamond spark arrester has had its day, and nearly all progressive men who are striving intelligently to reduce the consumption of coal have found a more economical means

of creating draft. To stimulate the fire by drawing the necessary air through the grates, a certain smoke-box vacuum is required. Experience with ejectors and injectors has convinced engineers familiar with physical investigations that velocity of steam has less to do with creating a good vacuum than the proper adjustment of the mechanical appliances employed. Those who have experimented with different draft appliances and had the means of showing accurately the effect of different combinations have also been led to the same conclusion. The ejector principle is undoubtedly the true and proper line to work on for creating draft with low steam velocity, and the hope of some investigators who are now working up this subject is to find a nozzle arrangement that will create the necessary vacuum in the smoke-box, yet tend to form a vacuum in the cylinders instead of back pressure. It would be difficult to conceive of a more irrational arrangement for creating draft on the ejector principle than two nozzles set side by side passing columns of steam into a chimney with which neither can be central. That the arrangement ever became popular is astonishing, and its general introduction was possible only through economy of fuel receiving a little attention, and from the fact that methods of measuring the relative wastefulness of different ways of maintaining draft received practically no attention. It was a very loose way of deciding on the merits of anything new applied to the engine, to ask the engineer how it worked. Many a good thing has been unjustly condemned, and many a worthless appliance temporarily prospered by such unbusiness-like methods.

The mechanical departments of several railroads are trying exhaust-pipes designed after the pattern used by Mr. F. W. Webb, London and Northwestern Railway. There has been no difficulty in making all the steam needed when this nozzle was in use, but most of those who have applied it have made their exhaust-pipe too small for boring out to the large size admissible with this means of fanning the fire. Mr. J. N. Barr, of the Chicago, Milwaukee and St. Paul, is experimenting with nozzles on the ejector form. He has got sectional drawings of the leading ejectors and injectors, and is trying draft appliances adjusted as nearly as possible according to the proportions that have worked so successfully in raising water and in expelling air. Mr. W. W. Sprague, general foreman of the Chicago, Rock Island and Pacific repair shops at Chicago, designed a single annular nozzle which has given remarkably good results. He passes the steam into a globular chamber which surrounds a pipe like a lift-pipe, and which performs the same functions. The steam passes out from the chamber by an annular nozzle 14 inches diameter surrounding the central pipe. The total area of the nozzle was equal to that of a round nozzle over 6 inches diameter, and it gave a higher smoke-box vacuum than the 3-inch double nozzles used on the road. Mr. F. C. Smith, Peoria, Decatur and Evansville, has also been working on an annular nozzle in combination with an improved form of exhaust-pipe, with which he hopes to effect a slight vacuum in the cylinder instead of the back pressure that exerts such a prejudicial influence on the working of many locomotives.

The Bergen, a screw ferry-boat built for the Hoboken Land and Improvement Company, and to run between New York City and Hoboken, was launched on Thursday, at Newburg, from the shipyard of Thomas Marvel & Co. She has a cast-steel propeller-wheel at each end, instead of the customary paddle-wheels. Each wheel is 8 feet in diameter, and the

two will be used whichever way the boat goes. We would repeat here that the boat will have triple-expansion engines built at the Delamater Iron Works, of New York, and will, accordingly, carry a very high steam pressure, never before tried on ferry-boats. It is of interest to note, also, that boats with propellers at each end have previously been used on the Detroit River, one having been built last year at St. Ignace, Mich.

Steel Rails in England and the United States.

J. Schoenhof, who is Consul at Tunstall, and who has obtained a good deal of notoriety through his efforts to show what is the cost of making iron, has added another contribution of the same kind. The Department of State has issued a special report, No. 49, which contains this document. As usual, it is an attempt, more or less successful, to guess at costs on the basis of partial or incomplete data. We quote from it the following:

In England the manufacture of steel rails has almost entirely been removed to the seashore. The transportation of the ores, as well as the transportation of the finished rails for export is, therefore, reduced to one carriage from the ocean steamers to the furnace and from the mill to the steamers, with but very little intervening additional expense. Large steel works situated in Sheffield, where I had expected to obtain information on the subject, had removed their rail mills to Workington on the west coast of England. Middlesboro' and neighborhood towns on the Tees are large producers of steel rails. Here the advantages for shipping and receiving are very great. The ocean steamers are wharfed alongside the works and the unloading and reloading on trucks are all the intermediate labor and expense required. The native ores for basic steel are not far distant. The Durham coal fields supply coke at a comparatively small transportation expense, according to the distance, from 2/ to 3/. The foreign ores are brought to the wharf close to the furnace, and so all advantages are made use of to save where alone savings are obtainable in the elimination of distance by judicious locating.

PIG IRON.

As to mining in the Cleveland district, the ore is of a soft nature and easily mined; it is of 31 to 32 per cent. Some of the mining is surface mining and other by shafts. A miner can mine easily 5 tons a day, working eight hours, for which he gets 10d. a ton. In very rich seams they mine as much as 6 to 7 tons. The employment is very regular, and 4/ a day is about the average for pretty nearly the whole year at the present time. The wages would be the same in bad times, too, only with the difference that the men would then have four or five days' work a week only. The differences in the labor cost in pig-iron making are caused principally by the quality of ore, the richer ores naturally requiring less wheeling, &c., to the ton of pig iron. The coke costs in Durham, put on cars, 8/, or \$1.94 per ton; transportation to Middlesboro' average two-sixths, or 60 cents per ton; total, \$2.54.

Cost of Cleveland Iron used for Basic Steel.

3 1/4 tons of ore at 4/ (96 cents).....	13/	\$3.14
1 1/4 tons of coke at 10/6 (\$2.55).....	11/6 6	2.80
3 1/2 ton of limestone at 3/6 (84 cents).....	2/0 4	.49
Labor.....	4/	.97
Wear and tear, repairing, stores, &c.....	2/	.48
Office expenses, &c.....	/6	.12
Total.....	33/1	\$8.00

Hematite Iron.

The iron is Spanish ore, of 50 per cent., brought from Bilbao. Cost, 7/; freight, 6/6; total 13/6, or \$3.28 per ton.

Cost of Iron for Bessemer Rails.

2 tons of Bilbao ore at 13/6.....	21.	7/	\$6.56
1 ton of coke at 10/6.....	10/6		2.55
2 1/2 ton of limestone at 3/6.....	1/4 6		.38
Labor.....	3/3		.79
Wear and tear, &c.....	2/		.48
Office expenses, &c.....	/6		.12
Total.....	22.	4/7 1/2	\$10.88

The four furnaces of the firm turned out in the week of November 12, 1887, which may serve as an average: Cleveland iron, 665 and 507 tons=1172 tons; and in two furnaces, hematite iron, 836 1/2 tons. Total, 2008 1/2 tons, at a cost in labor of £351. 19/2, or 3/6.1 per ton, equal to 85 cents. Of course it is not possible to exactly state the precise cost of labor of each species of iron made simultaneously in the different furnaces for which one general labor account is kept. The cost, as stated here, is pretty nearly the same as in other Middlesboro' furnaces. From the proprietor I have obtained a specified statement, a copy of the pay-roll of every laborer employed, and wages paid, which foot up as stated above. Other iron masters gave me the same cost, on inquiry. The statement of another firm is for four furnaces of 1674 tons only. Two of these turned out 744 tons, one 522 tons and one 408 tons. Ore, 3 1/4 tons in Cleveland iron, 2 tons in hematite iron; coke, 1 1/2 tons in Cleveland iron, 1 ton in hematite iron; coal for calcining, 1 1/2 ton; labor, 3/6, average; office expenses, rates, taxes, /9.

AMERICAN BLAST-FURNACE WORK.

The American furnaces are owned by the company manufacturing steel rails. They have eight furnaces, with an output per week of 3000 tons. The works are well managed and have all the modern improvements. The company makes the greater part of its own iron and uses about 30 per cent. of Cornwall iron in its output of steel rails. They use for their iron Cuban and European ore of 58 per cent. The quantities used per year are 60,000 tons from Cuba and 200,000 tons from Europe. The cost of ore per ton of pig iron is \$11, or, at 58 per cent., \$6.38 per ton at the furnace, against 2.90 of the same percentage of iron in the ore at Middlesboro'. Seventy-five cents duty added would still leave \$2.73 to be accounted for as covering the freight surplus charge from Bilbao or North Africa to Philadelphia over freight cost to Middlesboro', and the inland transportation from tide-water to the furnace, a distance of about 80 miles.

THE FUEL.

The fuel is three-fourths coke and one-fourth anthracite coal. The coke costs \$4.75 per ton, delivered at the works; the coal, \$2.85 per ton. The coke at Connellsville was then \$2 per ton, but at the later date of my visit in the coking region it had receded to \$1.75, put on board cars, and would, therefore, stand at \$4.50 delivered at the furnace. The difference would be in the transportation expense, which would seem rather a high rate. Coke, however, has been sold as low as 90 cents per ton at the ovens, and even at the present price is cheaper at the place of manufacture than at the ovens at Durham, where the English coke is obtained.

LABOR COST IN PIG IRON IN AMERICA (EASTERN PENNSYLVANIA).

The furnaces are worked by two shifts of 12 hours each. Each shift is composed of 16 men, or 32 men for the 24 hours on each furnace—in all 256 men for the eight furnaces, which is per man, at the 3000 tons weekly output, 11.72 tons. The boss men are paid from \$1.65 to \$1.75 per day, the furnace men \$1.30 per day, and ordinary laborers, &c., \$1.16 per day. The average of all employed is \$1.30 per day. The seven days at \$1.30 make \$9.10 per man. We have therefore to arrive at the cost of furnace work per ton by $256 \times \$9.10 = \$2,329.60$, which gives 77.65 cents as cov-

3,000

ering all furnace labor expense of making a ton of pig iron. The general labor cost was given me by the president as \$1.25, which leaves, therefore, a margin of 47.35 cents for all incidental and yard labor of handling ore, coke, coal and iron, unloading and loading, not included in the direct furnace work. The general expense is given me as 12 cents per ton; sundries, supplies, electric light, &c., as 50 cents per ton—in both instances about the same as in the English account. Taking the different items, then, we have the following positions in Bessemer pig iron in Eastern Pennsylvania, made of Spanish and Cuban ores, against English iron of the same class.

	Eastern Pennsylvania.	Middlesboro'.
Ore.....	\$11.00	\$6.56
Limestone.....	.40	.33
Fuel.....	4.50	2.55
Labor.....	1.25	.79
General expense.....	.12	.12
Sundries.....	.56	.48
Total.....	\$17.77	\$10.83

It will be seen that the only marked differences lie in the ore and fuel account, due to causes explained above.

COST OF MANUFACTURING BESSEMER STEEL RAILS IN ENGLAND.

The steel mill from which I have taken this account works in shifts of 12 hours. They make 40 charges per day, have two converters, and turn out 7 to 8 tons in each heat. The weekly output is 1500 tons, and the number of men employed is 600. The weekly pay-roll is £950. The average cost of labor per ton is therefore 12/8, or \$3.07 per ton. The several items in this sum stand as follows:

	s. d.	
Labor in converting.....	3 6	\$0.85
Labor in rail-making from the ingots.....	8 0	1.94
Additional labor.....	1 0	.24
Total.....	12 6	\$3.03

The cost of pig iron is taken as 45/ per ton; spiegeleisen, 80/ per ton.

	s. d.	
It takes 11-10 tons of hematite iron at 45/.....	49 6	\$12.38
It takes 1½ cwt. of spiegeleisen iron at 4/.....	6 0	1.44
It takes 14 cwt. of coal at 7/6 per ton.....	5 3	1.28
Labor.....	12 8	3.07
Total.....	73 5	\$18.15

The present price of steel rails is £3. 17/6. This leaves no margin for profit, and barely enough to cover the charges. asking whether the 4/1 between the selling price and cost price could not be considered in the light of a profit, I was answered: "Should we make the sum of 4/1 profit we should be pleased. It is a long time since railmakers could see a certainty of 4/ per ton." It must be understood that this is about the lowest price steel rails have ever reached in England, and it is the general expression that it is hard work now to get a new dollar for an old one. That the price is not a paying one can be seen from the favorable consideration which is given by English manufacturers to the proposal of German rail manufacturers to revive the old steel-rail combination, which has in view the raising of the price and the parceling out of the output and the trade between the English, German and Belgium manufacturers. The wages are, for fitters, turners, roll-turners and bricklayers, 5/6, or \$1.34 per day; for smiths, enginemen and joiners, 5/, or \$1.22 per day; for men at rolls and furnaces, average 7/, or \$1.70 per day, and for outside men, 4/, or 97 cents.

COST OF BASIC STEEL RAILS.

The mill is one which, in the opinion of ironmasters, is supplied with the best improvements, and equal to the best American mills in labor-saving arrangements, &c. I cannot say that in going over it I came to a like conclusion. I find the American rail mills which I have seen far ahead in improvement and the introduc-

tion of labor-saving devices over any at least that have come within the scope of my present observation in England. On the whole, it is conceded willingly by English makers that America surpasses them in the output and improved methods of manufacture. The iron used in this steel is Cleveland pig, but the cheaper price per ton is balanced by the greater amount of iron required for a ton of rails. About 800 men are employed, who draw in weekly wages (the week for which the account stands) £1294. 1/6, or \$6278, equal to \$7.84 per day, or per ton, 10/9½, or \$2.62. The account is as follows:

	s. d.	
1,3110 tons of pig iron at 33/4.....	43 8½	\$10.62
.1410 tons of ferromanganese (spiegeleisen) and hematite.....	9 10½	2.40
Fuel.....	5 4	1.30
Labor (converting, 4/4; rail-making, 5/11).....	10 3	2.49
Additional.....	8 10½	2.16
Total.....	78 0	\$18.97

The additional are given me as being in reality 9/9, or \$2.37, in excess of the other account. Labor items like brick-laying, &c., contained in the labor account of the hematite rail mill are here contained in the additional, the difference between 10/3 and 10/9½, or 6½d. = 13 cents. The greater part of this sum, 9/9½, however, is offset by the credit deduction for value of ends and defectives. The "additional" are higher in basic than in Bessemer steel. In this sum, royalty, lime, limestone, tar, refractories, castings and sundry stores and purchases for maintenance are contained.

THE AMERICAN COST OF MAKING BESSEMER STEEL RAILS.

The time when this inquiry was made in America was in 1887, a year of high prices. Steel rails had sold during the year at prices ranging from \$40 to \$32—during the greater part of the year being very close to the former sum named. At the time of my visit, in December, they were about the last named price. During the year wages were raised twice, each time 10 per cent. Whether these advances are still in force, I cannot tell. It is very doubtful, however, in view of the fact that steel rails are quoted now at \$28.50 f.o.b., to \$29, which is barely \$10 above the English price—a price likely to be advanced at a very early day as being unremunerative to the makers.

The weekly output is 4500 tons. The mill has four converters, but only three working. The men at the converters work in three shifts of 8 hours each, the rail-making employees two shifts at 12 hours each. In all, 1048 men are employed in the steel works. The pay-roll for the month was about \$57,000. This is \$54.38 per man per month, and at 25 working days, \$2.17½ per day and \$13.05 per week—about two-thirds more than the average English wages in steel mills. If we divide the amount of money paid for labor over the output, however, we shall find no such difference to exist, as these higher earnings might leave people to suppose. The weekly wages of the month of fairly even distribution of work over each week and steady employment of the men stand as \$13,680, and the output of 4500 tons gives us labor cost per ton thereof \$3.04 of all moneys paid out on this heading.

Salaries and expenses were stated at 50 cents per ton. On an output of 225,000 tons, \$112,000 for years of equally full output. The general labor cost was stated to me as \$3.85 per ton. I cannot well understand what items these additional 84 cents would comprise, as the outlays for wages of \$56,000 to \$58,000, I was told, cover all labor employed at the steel works. I give this as received and leave closer analysis to a future re-examination of the details. The different items of cost

are composed of the following factors as given from the mill account:

Items of Cost in 1 Ton of Steel Rails in Eastern Pennsylvania.	
1 ton of pig iron.....	\$18.00
3 cwt. spiegeleisen.....	4.00
Fuel.....	2.00
Labor.....	3.04
Sundries.....	.50
Additional labor (unexplained).....	.84
Total.....	\$28.38

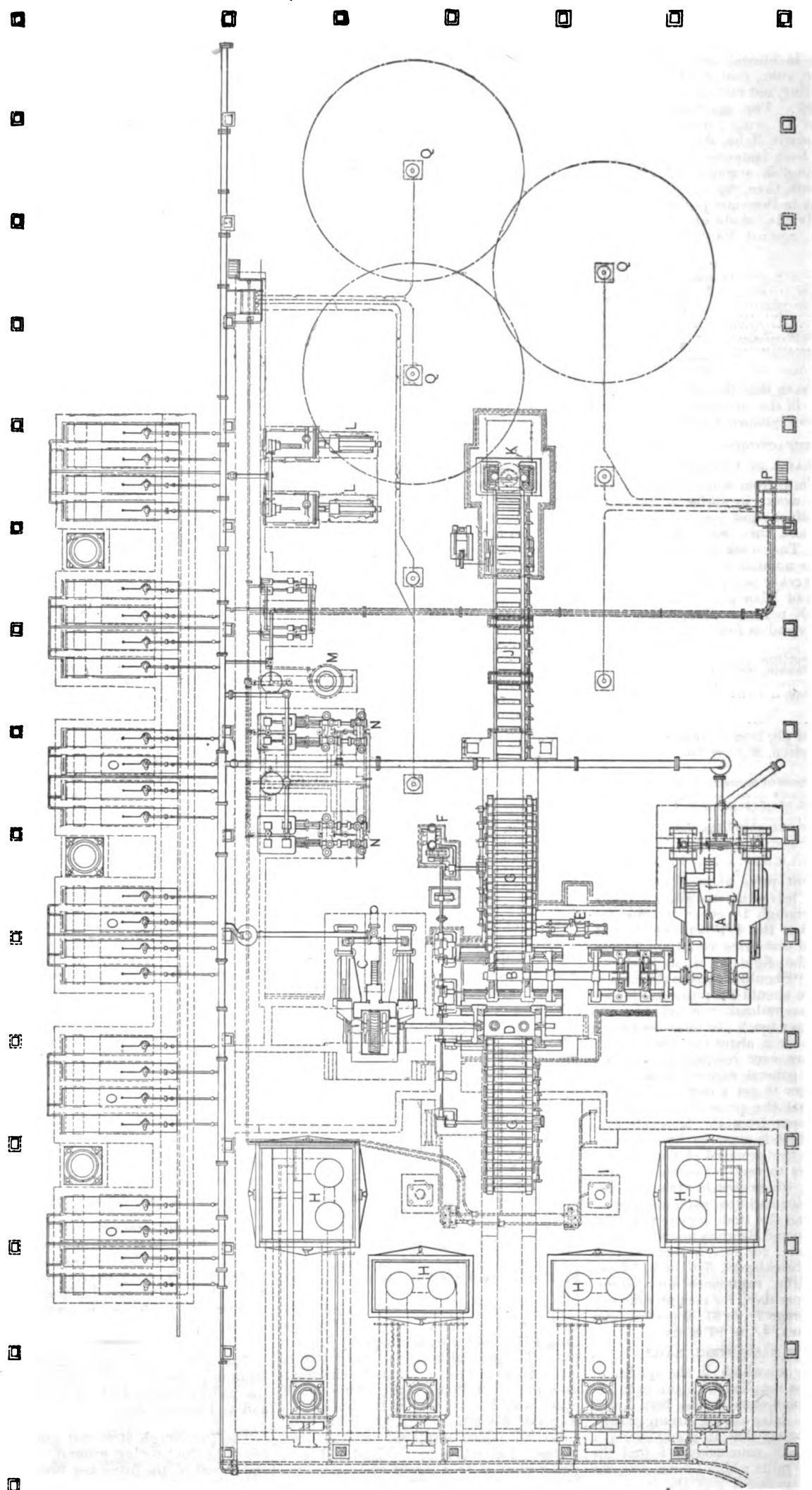
At \$27 a ton for spiegeleisen, the above \$4 represents 3 cwt. against 1½ cwt. in the English statement, which is balanced by 1 cwt. more of iron used in the Middlesboro' account, there is, therefore, in this account ½ cwt. more used than in the English mill. With \$3 of spiegeleisen 1½ tons of iron and \$2 worth of scraps are used, and with \$4 of spiegeleisen 1 ton of iron is said to be sufficient. While the English only use in all 1.175 tons of weight, this account would give us 1.30 tons of weight per ton of rails, which, if correct, would need further explanation than I can give at the present writing. At any rate, the difference in the weight would be returned again, or approximately so, in the value of scrap, ends, or misfits.

On the whole, it will need no demonstration to show what has been intimated in the opening pages of this report, that the differences in the labor cost, not alone of steel making, are not very great and come very nearly the English cost, but also in the materials used in its production. The difference of cost lies mainly in the transportation expense of the component parts of pig-iron used in the manufacture of Bessemer steel. The relative positions in steel rail making, as well as the fact of high wages, compatible with relatively cheap cost, may be realized from the comparative statement of the output of the two mills, which gave the subject of this report: Tons of Bessemer steel rails turned out per week in a steel mill in eastern Pennsylvania, 4500; total number of men employed, 1048; output of tons per man employed, 4.3; average wages per day, \$2.17½; labor cost per ton of all employed in steel mill, \$3.04; tons of Bessemer steel rails turned out per week in a steel mill in England, 1500; total number of men employed, 600; output of tons per man employed, 2.5; average wages per day, 5/6 = \$1.33; labor cost per ton of all employed in steel mill, 11/6 to 12/8 = \$2.80 to \$3.08.

[We have no means of checking the accuracy of Mr. Schoenhof's figures so far as they relate to English works. But they are certainly very untrustworthy where they deal with American works. The establishment referred to in Eastern Pennsylvania is obviously the Bethlehem mill. Nominally this concern has eight furnaces. In reality, one is practically abandoned, and for a long time, since the beginning of the present year, only six have been at work. In round figures, the capacity of the seven active furnaces—taking their work over a long period—is 2850 gross tons, so that Mr Schoenhof's reckoning is much out of the way. The figures in fuel are wrong, and the cost of ore is too low. The estimates of cost of producing rails at Bethlehem are certainly incorrect, because no sufficient allowance is made for waste. Yet we expect to have Mr. Schoenhof's latest guessing paraded before an admiring public as unquestioned statements of fact.—Editor.]

The four oscillating engines of the steamship Great Eastern, used for driving the paddle-wheels, had 72-inch cylinders and a 14-foot stroke.

The Pittsburgh steel-cast gun has been tested at the proving ground, but no official report of the firing has been received at the Navy Department.



GENERAL PLAN OF SLABBING MILL, CARNEGIE, PHIPPS & CO., HOMESTEAD STEEL WORKS.

The Homestead Steel Works.

We question whether during the past few years any single iron working establishment in the United States has developed more rapidly than the Homestead Steel Works of Carnegie, Phipps & Co., near Pittsburgh, nor are there many which can compare with it for ponderous machinery and the latest features in American practice. In some departments it occupies an exceptional position. Originally a rail mill, equipped with two small converters, it has expanded in a few years to the largest works for the manufacture of plates and structural material in the country. How rapidly some of the improvements were called into being may be understood when we state that possession was taken of that part of the ground on which the open-hearth works, plate mill and slabbing mill now stand, on the 26th of April, 1886. On the 14th of October in the same year the first of the open-hearth furnaces was in operation. It is particularly with these later parts of the plant with which we propose to deal, presenting in succession drawings thereof. The nucleus of the works were the mill of the Pittsburgh Bessemer Steel Company, consisting of two 5-ton converters, which made their first blow on March 19, 1881, and a 30-inch blooming train, and a 28-inch rail and billet train on which the first rail was rolled on the 9th of August of the same year. In times of great activity in the rail trade, this part of the works has produced rails, but its main work is to furnish mild Bessemer steel for the structural shapes rolled by the company. The greater part of the product of the open-hearth furnaces is used in the manufacture of plates.

THE SLABGING MILL.

We present a plan of the new slabbing and armor-plate mill. It is a building 800 x 120 feet, and a 35-foot lean-to for the boilers. The plant consists of eight vertical heating furnaces, H, 6 feet diameter in the clear, and a circular roof, the ring casting of which is of steel. They are grouped in the manner shown in our engraving. The two hydraulic charging cranes I are of the Aiken type, with a capacity of 35 tons. The main cylinder is 20 inches in diameter, with 13½-foot stroke, the height of the crane from the floor line to the bottom of the chord being 34 feet, while the swing has a 20-foot radius. The crane is swung by means of rack and pinion, the hydraulic cylinder having a 6-foot stroke and an 8-inch diameter. A small hydraulic cylinder at the end of the jib is used to grip the ingots by means of a very ingenious and simple tackle. The slabbing train itself consists of two sets of rolls, one of vertical steel rolls, D, 20 inches in diameter, driven by a special E. P. Allis reversing engine, 30 x 54 inches, C, and one pair of horizontal rolls, B, 32 inches in diameter, 60 inches long, driven by a pair of 40 x 54-inch E. P. Allis reversing engines, A, with power tables, G G. This train we shall describe and illustrate in detail in a future issue of *The Iron Age*. This train has already dealt with ingots 36 x 48 inches, weighing 38,000 pounds, and is capable of handling 25-ton ingots, 48 x 54 inches. The table rollers, all steel, are driven by the special engine F, a 10 x 12 Crane make.

The slabs are delivered to the table J, 74 feet long, the rollers being driven by a special engine, as shown. The slabs are sheared by a 3000-ton shear, K, details of which were published in a recent issue. At the time of our visit a gauge was being attached to the shear-table, to allow of the slabs being sheared to exact dimensions without taking any measurements. The shear is served by two pressure pumps, L, the largest of their kind,

built by the Southwark Foundry, of Philadelphia. They have a 65-inch steam cylinder, a 10-inch water cylinder and 8-foot stroke, and are worked at a steam pressure of 175 pounds, and are capable of yielding a water pressure of 4000 pounds per square inch. The general hydraulic service of the mill is supplied by two Wilson-Snyder duplex pumps, N, with 8 x 18 inch plungers, and an accumulator. Steam is furnished by six batteries of boilers, O, 44½ inches in diameter and 26½ feet long, the fronts having been built by Carnegie, Phipps & Co.

The crane service includes the two 35-ton charging cranes I, already alluded to, built by the Keystone Bridge Company; two 16-ton slab cranes, also built by the Keystone Bridge Company, and seven 5-ton slab cranes, built by the Southwark Foundry. At the time of our visit a line of 5-ton and 16-ton cranes was being placed along the outside of the building for handling and storing slabs.

Aside from the ponderous character of the machinery in this slabbing mill, and its spacious dimensions, the principal point which is sure to strike the visiting iron-master is the small number of men in so large a plant.

THE OPEN-HEARTH PLANT.

The open-hearth plant comprises four furnaces, No. 1 being a 15-ton basic; No. 4, a 20-ton basic, and Nos. 2 and 3, 40-ton acid furnaces. The latter have taken a maximum charge of 88,400 pounds, their average charge being 65,000 to 70,000 pounds. The furnaces are circular, using natural gas, the stack being placed back of the furnaces, with checker-work for preheating the air in the flues. On each side of these flues are narrow cooling flues. The furnaces are so placed that the charging is done from the general floor level, the steel being cast into a ladle, mounted on a central ladle crane capable of taking 40 tons of fluid metal, so that castings up to 100 tons can be made by casting from two or more furnaces. On either side of the ladle-crane are two semicircular casting pits, only a few feet below the general level, each pit taking four groups of molds, bottom casting being generally employed. The pits are flanked by 5-ton ingot cranes, four of which command the furnace itself, the ladle-pit and the casting-pits. There are 16 of these ingot cranes. At one end of the melting-shop a small steel foundry has been equipped with core-room, &c. A large number of castings have been made, among them some very large ones, already alluded to in *The Iron Age*. Near it a plant has been put in for making basic material, including a Gates crusher, a mixer and a calcining cupola.

THE PLATE TRAIN.

The plate train is housed in the same building with the open-hearth steel furnaces; the total length of the structure being 967 feet, with an 86-foot main span, and two 45-foot lean-tos. The train is served by six heating furnaces of special design, placed in two groups of three with their working doors in front of a circle. Their principal feature is that the ports are so designed that the entire hearth surface, 25 feet 1 inch by 6 feet 9 inches, is available for heating. Like in the open-hearth furnaces, the checker work is in horizontal flues, surrounded by air-cooling flues, the reversing valve being back of the chimney. The two semicircles of heating furnaces are commanded by two cranes, the ingenious arrangement of which quickly attracts attention. All the movements are controlled by one man perched on a seat facing four levers near the end of the jib. By means of a hydraulic cylinder he can grip the slab, with the aid of another controls the forward and backward movements of the car on which he is seated, and can thus deposit the slab within the range of the crane; by means

of a third lever he can raise and lower the jib, and with the aid of a fourth can work the rack and pinion which swings the crane. Their operation is exceedingly rapid and precise, and they have been the means of very materially increasing the capacity of the mill. We may mention that they have a reach of 44 feet to the back of the furnace. The plate train itself is three-high, with 32 inch top and bottom, and 24 middle roll; their width being 119 inches. On the roller's side it has one stationary table, 17 feet 10 inches long, followed by a feed table 80 feet long. A similar table is on the catcher's side. The train is driven by a 42 x 54 inch Mackintosh-Hemphill engine, with a 27½-foot fly-wheel, weighing 35 tons. It is served by a hand-roll crane on each side. The table on the catcher's side is followed by a table 22½ feet long, and then the plate is carried on to a series of tables aggregating in length 350 feet to the shears. By rollers driven by a special 8 x 12 engine, the finished plates are thus carried along slowly to the shears. The influence of this arrangement upon the quality of the plates and its convenience and economy of labor can hardly be overrated. Instead of being piled upon one another as soon as rolled, to cool irregularly, as accident may dictate, with the buckling and internal strains thus created, the plates cool gradually and uniformly. Ample time is afforded to mark them for shearing, for inspecting them carefully, for marking the position of the test pieces, &c. All this is accomplished with a minimum of labor.

Returning to the plate mill proper, we may note that it is equipped with two 6 x 18 feed pumps and three Southwark pressure pumps with 9-inch plunger and 18-inch stroke. Steam is furnished by four batteries of boilers connected with two stacks.

The plate traveling along the tables referred to reaches the shears, of which there are five, three large shears built by the Morgan Engineering Company, one scrapping shear and a trimming shear. In order to permit of easy and rapid handling, numerous casters are grouped about the shears, and from one to the other, and to a very simple and efficient scale arrangement. A platform resting upon a hydraulic cylinder is raised to carry the plates slightly above the level of the casters, and thus the weight is registered. There are in the shear department 13 5-ton cranes, and eight new ones are being put in along the outside of the building to facilitate shipping and stocking plates.

At the time of our visit there were lying ready for shipment four plates of exceptional size, which may serve to illustrate the capacity of the plant to turn out heavy work. These plates were 2 inches thick and 108 x 120 inches, their weight being 7000 pounds.

Reviewing the equipment, it will be noted that it possesses exceptional, and, we may say unrivaled, facilities for handling heavy plates and for putting work into the steel. The slabbing train through its construction secures a thorough working of the sides of the ingot.

We may mention here that it is the plan of the management to use the train also for rolling octagonal shapes so that heavy shafting will become a specialty of the works. In rolling plates the slabs are cut into such lengths that the first reductions in the plate mill are made by rolling in a direction normal to that in which the steel was worked in slabbing. Thus the material is worked in both directions and the distinction of tests in the direction of rolling and vertically to it lose much of their force, if, in fact, it does not entirely disappear. An incidental advantage of this method, costly though it may be in the way of investment in plant, is the reduction in the amount of scrap made.

Another striking characteristic of the works is the economy in labor. Practically the trains are automatic and the handling is reduced to a minimum. The facilities for the shipment of goods, with the additions to the crane service now being completed, are exceptional, and place the company in a position to fill orders within a very brief time.

The New Navy.

In briefly reviewing the work on the new ships of the navy, the *Army and Navy Journal* says:

The work on the Chicago still continues at the New York yard, and it is hardly probable that she will be put in commission much before the first of next year. The double-turreted monitor *Amphitrite* was lately taken out of the dock at Wilmington, Del. Her bottom has been painted and otherwise fixed up. The department has as yet reached no decision as to whether the ship will be rebuilt at a private yard or at some navy yard. The new cruiser *Charleston*, now building at San Francisco, Cal., will be completed about January 1, the contract time, as the department is in receipt of reports from the contractors saying that the work is progressing very rapidly, and that the ship will be turned over to the Government at the time specified. Of course she will be assigned to the Pacific station, and will be the flagship.

The Philadelphia *Inquirer* says: "The Philadelphia, it is expected, will beat the Baltimore in speed, as Messrs. Cramp will supply their own engines to the former, whereas the firm of Humphreys & Tennants; England, will provide the motive power for the latter. In the one case Messrs. Cramp guarantee a speed of 19 knots; in the other they only guarantee horse-power. It will be interesting to compare the work of the two sets of engines when both vessels are in commission. The model of the Philadelphia, although an English design, is considered by the Messrs. Cramp to be a very good one, and capable of but little improvement in view of the work the vessel will have to perform. The dynamite cruiser *Vesuvius* was sent down the river, October 1, to try how the engines worked. The affair was kept very quiet, only a privileged few being notified of the event. So far as could be learned, the trial was a most successful one, the vessel showing extraordinary speed, making a run of 13½ miles in 29 minutes, being an estimated speed of nearly 27 miles an hour. As the guaranteed speed is only 20 knots an hour, this, if correct, is eminently satisfactory. Allowance has, however, to be made for the tide, which would deduct about two knots off the record, but even then the result exceeds the expectations of the builders."

We learn that everything worked well on this trial. There was no heating of journals and no leaks anywhere and very little vibration. Two hundred and forty revolutions were reached without effort, but no measurements of speed were taken, as the trial was only made to find defects in the engines, if any existed. One of the builders has written to an officer of the War Department that a speed of 20 knots was obtained with a pressure of only 135 pounds. All indications point to additional speed when the full working pressure of 180 pounds is put on, and it is then expected fully 28 knots will be made.

In the naval appropriation bill, approved September 7, 1888, provision was made for the construction of seven new vessels, and an appropriation of \$5,550,000 was made, and an additional appropriation of \$260,000 for a composite ship to be used as a practice vessel for the midshipmen at the Naval Academy. Secretary Whitney has

now under consideration a number of designs for these new ships, and as soon as the designs are adopted, work will be immediately started on the plans and specifications, and the contracts awarded.

Tests of Rivet Steel.

In the course of an interview, published in the New York *World* on September 21, Commander R. D. Evans is quoted as saying, in illustration of an alleged improvement in the quality of steel furnished as the result of the operations of the Navy Department during the past few years:

When the first contracts were made by the present administration of the Navy Department it was considered exceedingly doubtful if rivets, or rivet stuff, showing an elongation of 30 per cent. in 8 inches and an ultimate strength of 50,000 pounds per inch could be obtained in this country. Such material was finally made by firms in Pittsburgh, and it created comment all over the professional world. Under the present contract for the Maine and the specifications furnished by the Navy Department, the rivet material averages 33 per cent. elongation in 8 inches, and an average ultimate strength of 56,000 pounds per square inch. Such material as this at the time of the original contracts, or the first contracts made by the present administration of the Navy Department, would have been considered absolutely impossible.

The choice of this particular example by Commander Evans was unfortunate, since there are on record figures proving that steel rivets of high quality were made for the navy prior to the time stated. We have before us a report by Prof. W. H. Burr, of the mechanical laboratory of the Rensselaer Polytechnic Institute, at Troy, dated November 23, 1883, which contains the following series of tests:

Number of specimens.	Diameter of specimens in inches.	Pounds of stress per square inch at		Per cent. of final stretch in 8 inches.
		Elastic limit.	Ultimate resistance.	
2.....	0.73	40,100	62,600	26
3.....	0.74	37,200	62,300	28
4.....	0.734	37,800	60,500	30
5.....	0.728	38,500	61,100	28
6.....	0.73	37,300	61,200	29
7.....	0.73	37,300	62,100	25
8.....	0.734	36,900	61,500	31
9.....	0.725	43,100	70,700	26
10.....	0.73	42,200	60,200	29
11.....	0.73	39,600	63,500	30
12.....	0.73	39,600	60,200	30
13.....	0.726	39,100	61,300	27
14.....	0.73	37,300	58,800	30
15.....	0.725	38,700	60,500	31
16.....	0.729	39,300	61,400	31
17.....	0.724	37,840	61,450	29
18.....	0.724	38,350	61,200	32
19.....	0.725	38,700	61,500	27
20.....	0.725	37,900	61,240	30
21.....	0.726	38,900	62,300	28
22.....	0.725	38,740	62,000	28
23.....	0.73	39,000	60,200	30
24.....	0.73	37,500	60,200	27
25.....	0.73	39,200	61,200	28
26.....	0.73	37,900	61,100	26
27.....	0.725	38,740	62,200	25
28.....	0.73	39,600	59,200	29
29.....	0.73	41,050	64,440	28
30.....	0.73	38,200	60,200	28
31.....	0.73	37,300	61,200	28
32.....	0.73	38,400	60,200	30

The specifications called for an ultimate tensile strength of at least 60,000 pounds, and a final elongation in 8 inches of not less than 23 per cent. An excess over 60,000 pounds was allowed, provided the ductility remained at least 23 per cent.

Heating Rolls by Gas.—London *Engineering* illustrates and describes a device for heating rolling mill rolls by gas. The latter is burned in jets, which are uniformly distributed the whole length of the rolls at each side. When these jets are lighted and the machine is put into slow rotation, every part of each roll is gradually and uniformly heated without the

production of any dangerous strains. This method of heating rolls we understand is in use by Messrs. Bolckow, Vaughan & Co., the Dowlais Iron Company and the Steel Company, of Scotland. In one mill the average life of the rolls previous to the application of the gas was 79½ days, and, after the application, 342 days. In another large plate mill, with rolls 36 inches by 9 feet, and weighing each 17 tons, two rolls only have been broken, and both cases were due to the neglect of the men in charge in not turning on the gas. Even these rolls ran 342 days each. The device is the invention of Mr. Franklin Hilton, of Middlesboro'-on-Tees.

Cost of Iron Making at Troy.

During the course of the Burden trial at Troy, John H. Allen, expert accountant, testified as follows:

The books of the Burden Iron Company showed that in April, 1886, the quantity of Hudson River ore used in the mixture at the Burden works was 25 per cent. After that it was increased, until in January, 1887, it was 50 per cent., and it had remained at 50 per cent. ever since, down to September, 1888. The quantity of this ore received in 1885 by the Burden Iron Company was 56,080 tons, in 1886 it was 10,475 tons, and in 1887 it was 11,661 tons. The cost in 1885 was \$3.11 $\frac{1}{4}$ per ton, and in 1886 it was \$3.13 $\frac{1}{4}$. These figures show the cost of the ore laid down at the works. The average of pure metallic iron in the ore, as shown by the company's analysis book, was 45.54 per cent. in 1884, 43.26 per cent. in 1885 and 43.98 per cent. in 1886. The average cost of pig iron made by the Burden Iron Company in 1883 was \$21.48. The output was 15,798½ tons. In 1884 the cost of pig iron made by the company was \$18.33 per ton, and the output was 23,583½ tons; in 1885 the cost was \$17.38 a ton, and the output was 13,578 tons; in 1886 the cost was \$18.96½ a ton, and the output was 15,197 tons; in 1887 the cost was \$19.17½ a ton, and the output was 9132 tons. January 1, 1885, there were 5496 tons of pig iron on hand, according to the inventory, and it was rated at \$17.50 a ton. January 1, 1886, there were 8571 tons on hand, inventoried at \$16 a ton. January 1, 1887, the inventory showed 7064 tons on hand, and the value was fixed at \$16.50 a ton, and January 1, 1888, there were 6668 tons inventoried at \$17 a ton. The cost of making iron at the Burden works this year was stated as follows: January, \$18.20; February, \$19; March, \$18.94; April, \$17.53; May, \$20.61; June, \$24.01; July, \$23.36; August, \$19.12; September, \$17.09. Other figures were given showing the cost of pig iron other than that of the Hudson River company, with the intent to establish the allegation that as good a grade of ore could be laid down at the Burden works at a less figure than was paid the Hudson River company.

The channel span of the Chesapeake and Ohio bridge at Cincinnati was successfully connected on Saturday. Work is well along on the remaining shore span, and the company expect to be running their cars into Cincinnati by December. The railroad along the Ohio River, which connects with the bridge, is about completed, and will be turned over to the Chesapeake and Ohio in a few days.

The high railway speeds recently attained on several English roads show that where sufficient inducement offers modern railway appliances are capable of approaching very closely to the apparent limit of 1 mile a minute.

Riverside Iron Works, Wheeling.

During a somewhat hurried visit to the Nail City, a representative of *The Iron Age* had occasion to inspect a part of the plant of one of the most important and progressive enterprises of Wheeling, the Riverside Iron Works. During the past few years its management has led in the momentous changes which have relegated puddled iron to an inferior position, and have won for Wheeling the distinction, of occupying beyond the question even of its rivals the position of arbiter of the cut-nail trade, and of shaping largely the course of the trade in soft-steel billets and slabs. To the Riverside Iron Works individually belongs the credit of leading in the substitution of soft steel for iron so far as nails, tubes and pipe are concerned.

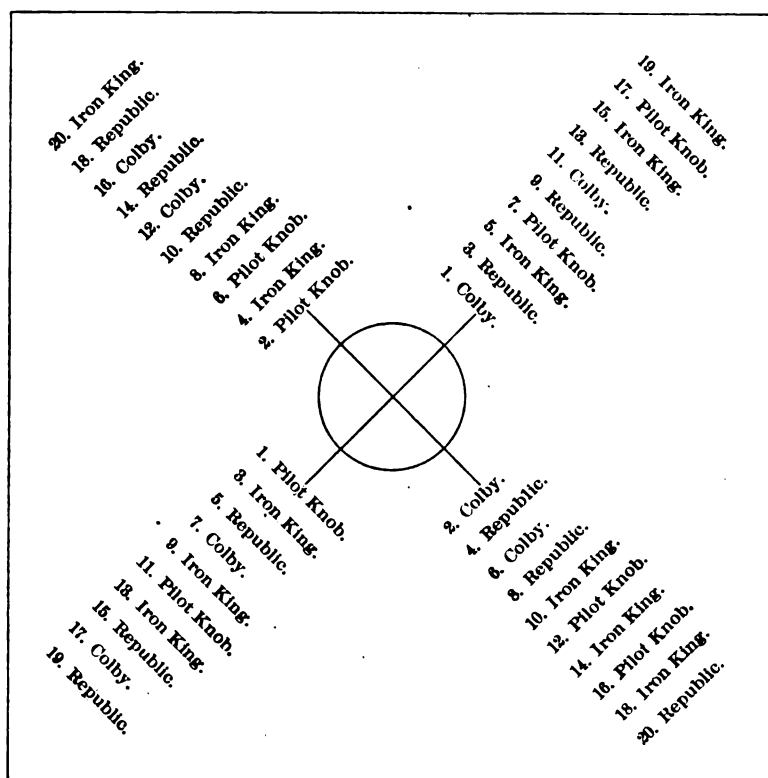
THE RIVERSIDE FURNACE

is a 16 x 75 foot stack, with a 9-foot crucible and a 6-foot bell, the stockhouse being 90 x 175 feet, the stock being lifted by an

I. P. Morris engine, with 36-inch steam cylinder, 7-foot-blowing cylinder and 6-foot stroke, and by a smaller Mackintosh, Hemphill & Co.'s engine, with 30-inch steam cylinder, 7-foot blowing cylinder and 4-foot stroke, the limit of pressure being 7 pounds. Steam is furnished by five batteries of 40-inch plain cylinder boilers, 52 feet long fed by a doctor. The smoke stack is 170 feet high by 9 feet diameter in the clear. The furnace has two cinder notches and an admirable arrangement for handling the cinder, being taken off laterally to a series of discharge troughs to the cinder cars, which are handled by a locomotive. The wall above the iron notch is cooled by four pipes entering the brick wall 18 inches. The casthouse is 170 x 55 feet. Near the furnace is a foundry in which all the castings for the plant are made, a machine shop and a carpenter shop.

THE STEEL WORKS

contain two five-ton converters, placed side by side before a 35-foot pit. The three 8-foot cupolas are located on one



Otis hoist. The ore used is Pilot Knob, Colby, Iron King and Republic, an ingenious system of charging having been adopted. The charging area is divided into four quarter sections. In order to properly distribute the fine ore the different classes of ore are charged in accordance with a schedule, a copy of which is framed under glass in the stockhouse and on the top, and appended herewith. Taking into account the fact that the Iron King and the Colby are the soft ores, while the Republic and the Pilot Knob are hard, it will be observed that the same even and odd numbers placed opposite one another are always soft on the one side and hard on the other. In order to prevent the uneven distribution of the stock, which grows out of the fact that the bell in descending swings in an arc, a part of the circle of which the length of its lever is the radius, a roller is provided which guides it vertically. The result of the system has been an increase in the life of the furnace, one campaign having given 88,000 tons on one lining and the last over 100,000 tons. The furnace is equipped with four Player hot blast stoves, yielding a blast temperature of 900° F. The blast is furnished by one

side of the pit, and opposite to them is the crane for handling ladles and bottoms. The distinguishing feature of the plant is that the iron ladle is handled by an overhead Morgan crane, an arrangement which does away with troublesome gutters, and permits of pouring the iron without any waste whatever. It has been found, however, that the dust naturally incident to Bessemer works has a prejudicial effect upon the crane machinery, causing delays and breakdowns through rapid wear. The overhead crane is also used to put on the bottoms. The two converters are served by one central ladle crane and an ingot crane, a hydraulic pusher being provided to strip ingots which have been stuck. The ingot crane deposits the ingots on trucks which are switched out of the works on to the track which takes them to the crane commanding the heating furnaces and the table of the blooming train. The plant which was built for a capacity of 100 tons of soft steel ingots per turn has far outstripped that figure, 191 tons of ingots having been made in one night shift recently, in 46 heats, which has been the highest record thus far. The slower cooling of mild steel, generally speaking, makes the pit capacity even more a factor

than in rail steel work, and in the special case of the Riverside mill the crane service is somewhat inadequate toward handling output regularly so far beyond the first plans. The steel made ranges in carbon from 0.08 to 0.09 with 0.30 to 0.40 manganese, the ferromanganese being pre-heated.

The blooming train is a 26-inch Mackintosh, Hemphill & Co., driven by a 28 x 42 inch reversing engine by the same firm, and equipped with a shear by the same makers, the ingots rolled weighing about 3100 pounds. It is served by two heating furnaces and runs alternately on slabs and billets, being more than able to keep up with the converter capacity on the one and not quite with the other form.

In a line with the steel works is

THE NAIL PLATE AND SKELP MILL.

which contains a two-high 21-inch nail-plate train with three stands. It is now being changed to 3-high. It has a capacity of 80 tons in 24 hours and is equipped with two regenerative gas heating furnaces. The same engine, with 36-inch cylinders and 6-foot stroke, drives a three-high 21-inch skelp train, with three stands of rolls. The nail-plate train is served by three nail-plate shears, while the skelp train has two skelp shears and one nail-plate shear, all driven by a special engine, which runs also two grindstones and two roll lathes. The skelp train has two heating furnaces, which, like the others in the plate mill, are arranged to use either producer gas or natural gas. The nail-plate train handles about 20 heats in 24 hours, while the skelp train takes 14 heats, rolling skelp from 15½ inch down to 5½ inch, the quantity being about 60 to 70 tons in 24 hours. At another mill in Wheeling, owned by the company, they have additional capacity to roll 65 tons skelp daily. The nail plate is conveyed to the nail factory of the company, which has the distinction of being the largest in the world, the number of machines being 224. A part of the steel skelp is sold in the open market, the greater part of it, however, being worked in

THE NEW TUBE MILL

of the company, the building of which for making steel tubes being a bold step in the direction of progress, which has been fully justified by success. We have repeatedly alluded to the quality of the product. Suffice it to say that a series of specimens are exhibited at the office at the mill, which show that not alone the material itself, but the weld, too, can endure exceptionally severe torture. So far as the material is concerned, we have during our visit seen pieces of the skelp taken at random among the pieces as they fell from the shears bent back and forward at right angles 14 times before the first signs of fracture appeared. Among the most interesting tests of the pipe itself were pieces of it plugged at both ends and then submitted, filled with water, to extreme cold. While iron pipe under identical conditions split, the steel pipe resisted the strain, the malleable iron plug giving way. In another case the end was welded up, and then only a slight bulge told of the strains to which the specimen had been submitted. The mill itself is a building 300 feet wide, in three spans, and 300 feet long, and has the necessary outbuildings, machine shop, blacksmith shop and store houses. In the lap-weld department, in which 8 inch down to 1½ inch lap-welded pipe are made, there is one scarfing and bending furnace, and one welding furnace. At the time of our visit double extra heavy 4-inch pipe ½-inch thick were being made there. In the butt-weld department there is one bending and two welding furnaces. The mill is equipped with hot and cold straightening machinery, hammers for welding couplings, tapering and tapping machines for couplings and threading machines for pipe, and hydraulic presses, every tube

sent out of the mill being tested by hydraulic pressure. The general arrangement of the plant is excellent, the skelp entering the mill on one end, and the finished pipe being delivered at the other end. They contemplate doubling their capacity in the near future.

So far as the use of mild steel as the material for pipes and tubes is concerned, its behavior during the different stages of manufacture is well calculated to remove any doubts in the minds of those who may have had occasion to watch the stock as it passes from one manipulation to the other. No split ends or imperfect welds were observed. In the butt-welding department the exact point where the half-finished tube had been gripped by the first die could be located by the weld, and throughout the markings for cutting off the end of the welded pipe were from less than 1 inch to about 3 inches from the rough end. This material has been found to be admirably suited to the manufacture of boiler tubes, one maker having purchased and used not less than 3000 tons during the past six months. One of the principal difficulties anticipated was that of threading the pipe. Unlike iron, which crumbles, the soft steel curls up in shavings, hugging the die closely, preventing thereby the oil from getting to the cutting edges of the dies. This difficulty has been overcome, to judge from the appearance of the threads on the piles of pipes which were lying ready at the mill for shipment.

Slipping at High Locomotive Speed.

Some ten years ago, says the *Railroad Gazette*, M. Rabeuf, an engineer on the Northern Railroad of France, noticed the slipping of locomotive drivers when running (and using steam) down grade, even without any train load to haul. He made several observations, and concluded that this slipping increased in some ratio to the speed, and that it was much greater at the same speed in descending than in ascending grades. He found, by measuring the distance run, and noting the number of revolutions made by the drivers in that distance, that the circumference of a driver multiplied by the number of revolutions, gave a product of from 13 to 25 per cent. greater than the distance. That is, fuel was wasted and tires and rails worn out by useless revolutions of the drivers. Several explanations of the phenomenon observed by M. Rabeuf were offered at the time, and within a year M. Durand-Gréville has published in the *Revue Scientifique* the remarkable theory that in going down grade the wheels tend to get away from the rail by the amount of the vertical component of the motion of the locomotive, and in going up grade they tend to approach the rails by the same component. Hence, he reasons, there is less adhesion in going down grade and increased adhesion in going up. M. A. Stévant takes, in a recent issue of *L'Industrie Moderne*, space to state the theory of M. Rabeuf and the more or less ingenious explanations of it, and to show that these explanations are mechanical illusions. This he does very prettily, but one is surprised to find that after all the ingenuity and erudition which he has expended on the subject he accounts for the phenomenon by the simple and conclusive statement that it does not exist. M. Stévant says that he made numerous runs between Liège and Verviers, registering the revolutions of the drivers, and found "no appreciable difference between the measured distance and the development of the circumference of the drivers multiplied by the number of revolutions." The distance between these stations is about 14 miles, and the difference of altitude about 400 feet. Moreover, M. Stévant made various long runs at high speeds with coupling rods removed, and found no appreciable

change in the relative positions of the crank-pins. He quotes various authorities, who sustain his position, that this particular kind of slipping does not occur. It seems probable that M. Rabeuf's figures were the result of the singular conditions under which he made his experiments, putting the reverse lever in full gear when running down grade.

The statement that engines slip continually while running at a full speed is often made, but almost invariably by persons of no practical experience, who appear to be unaware that any slip of the drivers can be instantly detected by an engine runner. Any one who has run a fast train knows that on entering a damp tunnel slipping occasionally occurs, but the vibration imparted to the engine is so peculiar that no one who has once felt it is likely to fail to recognize it again. Messrs. Abbey and Baldwin, when making some observations on the running of a Jersey Central express passenger engine on the Bound Brook route, found that the slip at high speed was practically nil. The wheels, as calculated from their diameter, should give 298.98 revolutions per mile. A counter showed that 298.62 revolutions per mile had been actually made, the difference being negative and only one-third of a revolution per mile, or within the limits of errors of observation. As these engines are run very hard and made to do their utmost, it might reasonably be expected that they would show slip, if any existed, at high speed. It is therefore reasonable to suppose that any continuous slipping at high speed is non-existent. The continuous slipping theory is supported by so very little evidence, either practical or theoretical, that it must take its place among the numerous other pseudo-scientific delusions.

German Prices for Steel Rails.

The *British Trade Journal* prints the following information concerning the prices obtained for steel rails by German makers. It shows very clearly that the German mills have everything to gain by a renewal of the international combination. They had a monopoly of the Government orders for rails according to the terms of the old agreement, were able to obtain an average price of £7 per ton, whereas, when the combination collapsed the price fell under the influence of Belgian and English competition, to £5. 8/. The following table shows the total of the Government contracts with the German works for the years enumerated, and the average price in each year at which the contracts have been accepted:

	Tons.	Average Price.
		£ s. d.
1884-85.....	71,300	7 15 0
1885-86.....	75,970	7 6 0
1886-87.....	75,563	7 3 0
1887-88.....	74,321	6 6 4
1888-89.....	78,763	6 5 0

These prices, of course, do not represent the rates at which rails have been sold for export. Last year, for instance, while the average interior price was £6. 6/4, the export price fell to £4. 12/. It is pointed out, however, that even if it declined to £4, the average of the export and interior prices realized by the German works would still show a comparatively good return. The following table shows the quantities exported and the average price for export in each of the past six years:

	Tons.	Price.
		£ s. d.
1882.....	186,054	6 10 4
1883.....	176,177	5 10 0
1884.....	144,463	5 17 5
1885.....	164,799	5 10 7
1886.....	163,221	4 13 0
1887.....	174,226	4 12 0

The considerable differences in price will be observed.

American Forestry.

The annual report of the division of forestry, Department of Agriculture, recently issued, contains some very interesting information. From an inspection of the import statistics it appears that the import duty laid upon manufactured lumber in 1872 had the effect at first of decreasing importations from Canada by from 50 to 60 per cent. until 1876-77 when an upward tendency of imports began. A comparison of the imports of the last three years with those of the preceding three, however, shows a noticeable decline in all classes of foreign products from the amounts to which they had gradually increased up to 1884, when the importation of manufactured lumber reached nearly the same amount that was imported in 1872. "For the decrease in unmanufactured wood," said Mr. Fernow, "the Canadian export duty of \$2 on logs may serve as an explanation, but other causes must have worked to effect the reduction of manufactured lumber in the face of a decided enhancement of value of product. The difficulty of access and increased distance from the market is probably the explanation." At the present stage of development, it is suggested that, so far as the saving of standing supplies is concerned, there need be no fear or hope from foreign competition, for the "quantity of standing pine in the United States and Canada is reduced to a condition of absolute control; it is held in strong hands on both sides, and will not be lightly frittered away." The stumpage price, it is predicted, which has lately advanced as never before, will necessitate the upholding of present values for manufactured lumber, and an advance of prices is as certain as a decrease of supplies. "An unbiased weighing of the arguments advanced on both sides," says the report, "leads to the conclusion that the removal of the tariff on lumber would have no appreciable effect upon the price to the consumer, nor be detrimental to the lumberman's or sawmill business, nor in the least affect the laboring man; but at the same time no appreciable benefit toward preservation of forests and forest supplies need be expected at this date from such removal." The report concludes with brief reviews of the condition of the forestry interest in each of the several States and Territories.

Oil at North Chicago.—The North Chicago Rolling Mill Company are now running 14 boilers at their South Chicago Works exclusively with oil for fuel. Thus far the results have been very satisfactory, but the managers of the company are not prepared as yet to express a definite opinion in regard to it. The oil is now being conveyed to the works in tanks, but a pipe line is contemplated from the South Chicago storage tanks, which will probably be built as soon as the tests now being made are pronounced conclusive. D. S. Mathias has been appointed superintendent of the South Chicago Works, to succeed J. W. McGinnis, who resigned a short time since.

The Phosphor Bronze Smelting Company, Limited, of Philadelphia, have issued a price list, No. 6, for October. It makes the price of Nos. 1 to 20 roll and sheet phosphor bronze, 2 to 6 inches wide 48 cents, which increases for higher numbers and greater widths. For phosphor bronze wire Nos. 1 to 16 the price is 50 cents a pound, for telegraph wire, Nos. 6 to 13, 35 cents; for telephone wire, Nos. 14 to 16, 45 cents; for $\frac{1}{4}$ inch wire rope, 28 cents per foot, increasing to \$1 per foot for 1 inch. These have 19 wires to the strand. Phosphor bronze wire-cloth, 2-

mesh No. 16 wire to 24 mesh No. 30 wire, is 50 cents per square foot. Cast bolts and nuts, $\frac{1}{4}$ to 1 inch, are quoted 45 cents per pound, and a table of prices is given for wood screws.

The Waterhouse Arc Lamp.

The Waterhouse electric arc lamp, of which we present details on this page, embraces several novel and interesting features. The form of magnet differs from all other arc lamp magnets. The lifting mechanism is free from friction, and owing to the simplicity of construction does not require expert care. Only one adjustment is necessary. The magnet is in the shape of quadrangle with four poles, two of them of constant and two of variable polarity. Under the variable poles is pivoted the armature A, which is held in position when

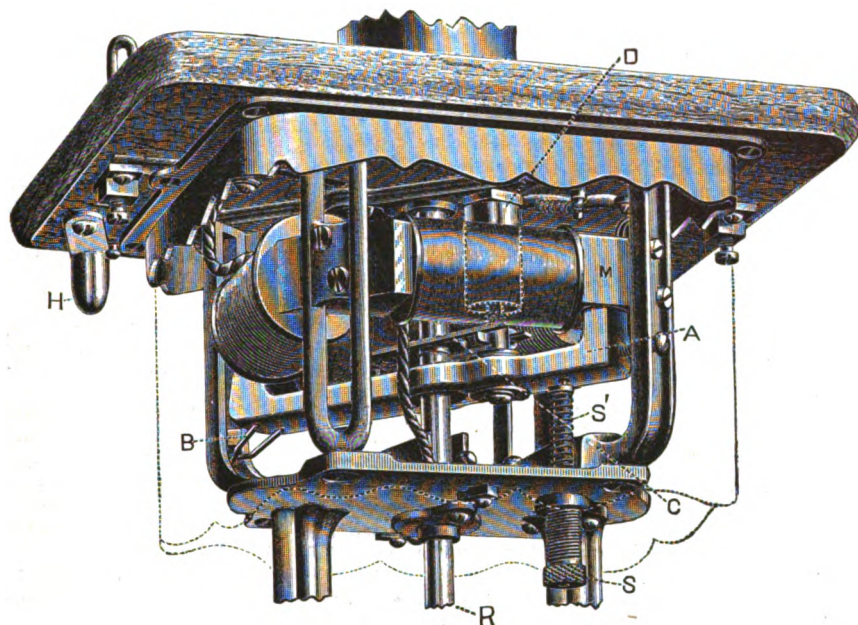
site effect upon the poles of the magnet, under which is the armature A. The result is less magnetism in the poles, and the armature will recede slightly, easing up on the clutch and allowing the carbon rod to feed. The carbons now being in the original position, the current again flows around the main coils as at first. The armature A is so susceptible to the changes of magnetism that a fine feed is maintained free from sudden commotion, and this is one of the important features of the Waterhouse system, which assists not a little in the production of a steady arc light. Adjustment is made by the screw S strengthening or weakening the spring S', so as to maintain a constant fine feed, which is an adjustment easy to make.

The lamp is provided with an automatic cut-out, and much attention has been paid to insulating the various parts and adapting the same to the convenience of the trimmer. The Waterhouse Electric and

ing the boilers. About this time was introduced the surface condenser, which, by separating the condensed steam from the condensing water, enabled the boilers to be supplied with fresh feed-water, and thus, by largely preventing the dangerous incrustation on the heating surfaces of the boilers, which resulted from lime and other scale when fed with sea water, enabled the pressures to be still further increased without increased danger due to liability of overheating of plates. This change of type of condenser, therefore, is very intimately connected with the increase in steam pressures, for most of the beneficial results which have followed that increase would have been impossible had not some such contrivance been introduced for keeping the deposit out of the boilers.

Like many other improvements, its general application in practice was delayed for many years after its invention. It was applied in a very similar form to that now used in modern engines as long ago as 1832, but became a usual adjunct of the marine engine only about the year 1860. With the old jet condenser a pressure of at the most 25 pounds per square inch was considered the highest it was prudent to carry in marine boilers, owing to the liability to overheating, and consequently danger of failure of the heating surfaces, due to the accumulation of scale from the salt water feed used. The adoption of the surface condenser almost entirely removed this difficulty. The loss of fuel with the jet condenser, through the necessary practice of blowing out the boilers in order to keep the density within limits, was also avoided by the surface condenser. At least 15 per cent. was the estimated saving of fuel by its use as given by the superintending engineers of the principal steamship owning companies at the time of adoption. Between 1860 and 1870 a large number of engines with surface condensers were fitted in vessels of the Royal Navy, the steam pressure being immediately increased, and was during this period usually about 30 pounds per square inch.

The engines of all the jet condensing vessels were of the simple expansion kind, the steam of low pressure being taken into the cylinder from the boiler, carried late in the stroke, and exhausted direct to the jet condenser. Only a very small amount of expansion was carried out, and with the low pressures then in use the gain to be derived from the expansion of the steam was necessarily of small amount, so that the consumption of fuel for a given power in engines of this kind was very high. During, however, the period above mentioned as that immediately following the introduction of the surface condenser, with the higher steam pressure of 30 pounds per square inch, the principle of expansion was adopted to a much greater extent, and the cylinders were made much larger, so as to allow of a considerable amount of expansion at full power, and considerable benefit was thus experienced in economy of fuel. To the engines of the period of which we are now speaking steam-jacketed cylinders were fitted, and although the gain to be derived from the use of a steam jacket was at that time a subject of great controversy, there is now no doubt that it was a very valuable adjunct, especially to the expansive engine then being made. Of similar use were the superheaters that were fitted to the boilers in connection with these engines. They consisted of an amount of heating surface in contact with the hot escaping gases of the boiler through which the steam passed on its way to the cylinder, and served the double purpose of utilizing some of the heat of the gases and also of increasing the efficiency of the steam. The steam jacket is still in existence in most modern engines, but the superheaters are now obsolete.



THE WATERHOUSE ARC LAMP.

no current is passing through the lamp by the supports B and the spring S'. The tension of the spring S' is changed by means of the screw S, so that more or less assistance can be given to the armature A by the spring S' as may be necessary to form the proper arc. Attached to the armature A is the clutch C, through which the carbon rod R is inserted, and it will be noticed that the air dash pot D is also connected to armature A, and any sudden motion of the armature upward is opposed by the dash pot D, or downward by the spring S'.

The current coming to the lamp enters at the terminal near the handle H, passes around the coarse wire coils on the magnet M, then to the carbon rod R, through the carbons and returns to the opposite terminal of the lamp, when it passes out on a conductor to the next. The current flowing around the main coils produces magnetism in the poles of the magnet M and draws up the tongue of the armature A into the elongated hole in the magnet M, and also lifts the armature A from the supports B. Drawing up the armature A actuates the clutch, which lifts the carbon rod R, and it in turn raises the upper carbon, and the arc is formed. As the carbons burn away, causing greater separation than at first, the resistance becomes stronger in the conductor around the main coils, and the instant it is greater than in the shunt coils a portion of the current will take that path through the shunt around the arc. The shunt coils produce an oppo-

sition effect upon the poles of the magnet, under which is the armature A. The result is less magnetism in the poles, and the armature will recede slightly, easing up on the clutch and allowing the carbon rod to feed. The carbons now being in the original position, the current again flows around the main coils as at first. The armature A is so susceptible to the changes of magnetism that a fine feed is maintained free from sudden commotion, and this is one of the important features of the Waterhouse system, which assists not a little in the production of a steady arc light. Adjustment is made by the screw S strengthening or weakening the spring S', so as to maintain a constant fine feed, which is an adjustment easy to make.

High Pressures in Marine Engines.

In the first of a series of articles on "The Development of the Marine Engine in the British Navy," the *London Engineer* gives the following interesting account of the increase of steam pressures and of the changes of types of engines which are intimately connected with that subject:

In the first steamships that were used in the navy—small vessels that were purchased complete—the steam pressure was about 4 pounds per square inch. The first of these came into the service rather more than 50 years ago, and represented the usual practice up to about the year 1843, the type of boiler being the flue variety. At about this date the flue boiler began to be superseded by the tubular, and the working steam pressure rose between the latter date and 1850 to about 10 pounds to 12 pounds per square inch, 12 pounds representing very accurately the practice about the year 1850. Between 1850 and 1860 the pressure rose to about 20 pounds per square inch. Up to this date the condenser in use was the old jet condenser, in which the condensation of the steam was effected by actual contact with a spray of sea water, the condensed steam became mixed with the salt water, and the mixture, which was but little fresher than sea water, was used for feed-

There can be no doubt that these expansive engines, with steam of only 30 pounds pressure per square inch, with steam jackets, superheaters and surface condensers were fairly economical, and were a great step in advance from those immediately preceding them.

The introduction of the surface condenser having proved a practical success, and there being now nothing to prevent higher pressures than the 30 pounds per square inch then in use being employed, attention was at once directed to the subject of higher pressure and the more complete utilization of the property of expansion in increasing the efficiency of the engines, a direction which theoretical considerations marked out as being a most prolific one. The result was that the steam pressure went at one step from 30 to 60 pounds, the type of boiler being changed to the cylindrical variety to carry this increased steam pressure safely, and the engine was completely changed to the compound type, in which the steam is first passed into a small cylinder, and at the end of the stroke in that cylinder is passed into one or more additional larger cylinders, and does there a further amount of work, and completes its expansion before being finally exhausted into the condenser. Perhaps no point caused more difference of opinion among engineers than the advantage or otherwise of the compound system. Its first application, indeed, was not a success, but this was made under unfavorable circumstances which were subsequently removed, and since then the system has been remarkably successful, and has caused a considerable impetus to be given to navigation.

In the compound engines the steam-jacket of the earlier types was retained as beneficial, but the superheaters were abandoned. The principal reason for each of the successive steps in the increase of steam pressure which has from time to time been made has always been the gain in economy which resulted, and the amount of this gain in economy by the compound engines using steam of 60 pounds steam pressure over the best previous type of simple surface-condensing engines with 30 pounds of steam pressure, by the adoption of this principle, was about 30 to 35 per cent. This gain is now well authenticated, and the amount mentioned above is the average of the replies given to questions of the Admiralty Committee on Designs of Ships of War, which sat in 1872, by the principal engineers and steamship owning companies.

Since about 1872, and up till very recently, the new engines of the Royal Navy have all been compound. The first of them, as mentioned above, had steam pressures of 60 pounds per square inch. This was increased in a few cases to 70 pounds and 75 pounds after a short time, and about the year 1880 to 90 pounds, the ratios of cylinder areas and the expansion allowed being increased with the steam pressure, so as to more fully benefit by expansion. From this date the rise of pressure has been rapid up to 120 pounds. Very recently, as is well known, attention has again been directed to the engine; and the compound engine being seen to possess defects at these higher pressures similar to those of the simple engines, it has been abandoned in favor of the triple-expansion engine, in which the steam is passed consecutively through three cylinders before being finally exhausted to the condenser. The success of this type, too, has been very striking, and for new engines it has completely displaced the compound type. Since 1885, with a few minor exceptions, all new engines of the Navy have been on the triple-expansion principle, and with boiler steam pressures of at first 130 pounds per square inch, gradually increasing to 155 pounds per square inch in 1887. A

further gain in economy has thus been effected, which is variously estimated. From 15 to 20 per cent. over the compound engine of the same pressure is often given as the amount of gain, and probably 15 per cent. may safely be taken as not too much.

An important development, which may appropriately be mentioned at this point, is the adoption of the double-distillation condenser for obtaining fresh water from sea water. This appliance is the sequel to the surface condenser and an extension of the same principle. As mentioned previously, the surface condenser converted the main body of boiler feed water from salt to fresh water; but it is found that a certain percentage of the water taken from the boiler in the shape of steam is lost during its transit back again to the boiler. In the vast majority of ships this deficit of feed water has to be made up by sea water; the scale from which, at the high temperature of the boiler, is deposited and left in it. A double-distillation condenser of sufficient size will obviate the necessity for this, a quantity of additional fresh water being produced by it without any deposit in the main boilers. It is not possible, however, to fit a condenser which will supply the waste of main engines at high powers, but only for ordinary cruising powers. With the modern marine boiler, however, which has of necessity its internal parts rather cramped for room on account of the limitation of weight, and especially in vessels without an auxiliary boiler, it is found to be really quite inadmissible to distill water for drinking and general ship's purposes direct from the main boilers, on account of the scale necessarily deposited inside, the difficulty of constantly cleaning them and the danger of overheating if not properly cleaned. This objection has caused the adoption of the particular form of distiller mentioned, in which the evaporation takes place in an intermediate vessel between the boiler and fresh-water condenser, and in this intermediate evaporator the scale is deposited, and the arrangements are such that it can be properly cleaned out and dealt with. The generation of steam in the evaporator is caused by the condensation of steam from the main boilers in or around tubes, and this condensed steam is returned to the boilers.

Ford & Moncur Stoves in Great Britain.

From data submitted by Leon & Blair, Pittsburgh agents in this country of the Ford & Moncur hot-blast stoves, they are meeting with much favor in Great Britain, the following list being published of stoves built and in course of construction in that country in May of this year:

Barrow Hematite Steel Works, Barrow-in-Furness.—Seven stoves built and working, viz.: One stove 20-foot diameter by 70 feet high; six stoves 26 feet diameter by 70 feet high.

North Lonsdale Iron Company.—Three stoves built and working, 26 feet diameter by 72 feet high, blowing two furnaces 80 feet high, with 20-foot bosh.

Darwen Iron Company's Works, Darwen, Lancashire.—Three stoves 21 feet diameter by 65 feet high, blowing two furnaces making ferromanganese, 20-foot bosh by 65 feet high each.

Mostyn Iron Works, belonging to Darwen Iron Company.—Three stoves 22 feet diameter by 65 feet high, in course of erection, intended to blow two furnaces making spiegel, 19-foot bosh by 68 feet high each.

Springvale Furnaces, Wolverhampton.—Five stoves, 25 x 65, blowing four furnaces—two 19 x 75 feet and two 18 x 65 feet.

Distington Iron Works, Cumberland.—Two stoves 24 x 60 feet high, two Wardle & Sister stoves altered to Ford & Moncur's patent, adding thereby 90 per cent. to the heating surface, these stoves blowing two large furnaces 70 feet high, making hematite iron.

Chas. Connell & Co., Derwent Works, Workington.—Two stoves 25 x 72, capable of blowing two furnaces; also an additional stove about to be put down at these works.

Maryport Hematite Iron Works, Cumberland.—One stove 26 x 60 and two Cowper stoves altered to Ford & Moncur's patent, 22 x 60 high.

Cleator Moore Iron Works, Cumberland.—Three stoves in course of construction, to blow two large furnaces 75 x 22 foot boshes; stove dimensions, 26 x 72 feet high.

Coltness Iron Works, Lanarkshire, Scotland.—Two stoves 26 x 72, blowing three furnaces making hematite.

Dalmellington Iron Works, Ayrshire, Scotland.—Two stoves 22 x 60 feet built, and two stoves 26 x 72 feet high in course of erection.

Carron Iron Works, Falkirk, Scotland.—One Cowper stove altered to Ford & Moncur's patent.

Harrington Iron Works, Cumberland.—Seven Cowper stoves fitted with Ford & Moncur's system of cleaning by means of compartments fitted with valves and blast pressure.

As to the efficiency of the stoves J. Hamilton, of the Coltness Iron Works, Newmains, Lanarkshire, reports to S. A. Fuller, of the Union Rolling Mill Company, Cleveland, that they are blowing three of their furnaces with two stoves, and that they "can easily register up to 1600° F. when wanted." Other letters from A. W. Hickman, of the Springvale Furnaces, near Wolverhampton; from A. E. Lamb, of the Whitehaven Hematite Iron and Steel Company, Limited, of Cleator Moor, and W. McCowan, of the Distington Hematite Iron Works, near Whitehaven, are similarly favorable in their tenor.

Upon one occasion at the works of the Darwen Iron Company, when they had only two stoves heating the blast for two furnaces, each 20-foot bosh by 65 feet high, an accident occurred which obliged them to lay off one of the stoves, and the other stove was blown for eight hours, and kept the furnaces running until the first could be repaired and heated ready for blast again. The first of these stoves to be erected in this country are now being built by an English company, known as the Talladega Iron and Steel Company, at Talladega, Ala.

An Advance in Coke.—The large coke operators of the Connellsville region, whose headquarters are at Pittsburgh, after holding several consultations regarding the condition of trade, have decided to advance the price of coke. On Thursday, the 25th inst., notices were mailed to the trade by the H. C. Frick Coke Company, the J. M. Schoonmaker Coke Company, the McClure Coke Company, the Connellsville Coke and Iron Company, and J. W. Moore & Co., that on and after November 1, 1888, the price for furnace coke will be \$1.25 per ton; coke for dealers, \$1.35 per ton; and foundry coke, \$1.50 per ton. This is an advance of 25 cents per ton over previous prices. No coke syndicate has been formed, the operators merely pledging themselves to make no new contracts at less than the rate agreed upon. The advance, of course, will not affect existing contracts. At the present time, the coke trade is in a better condition than at any time during the year. The blast furnaces are nearly all in active operation, which causes a corresponding heavy demand for coke. It is believed that the advance will not be objected to in any way by the coke consumers, as the price of pig iron at this time is nearly as high as at this time last year, when coke was selling at \$2 per ton. Freight rates and the prices of ore are also lower. It seems to be the impression that this advance will be followed by another about the first of the new year. The coke workers of the region have been notified that their wages will be advanced 5 per cent., to take effect on November 1, the date on which the advance in the price of coke goes into effect.

Radiator Tube Threading Machine.

A new automatic machine for threading radiator tubes has just been brought out by the Bignall & Keeler Mfg. Company, of St. Louis, Mo. The engraving on this page explains the character of the design. The machine has the advantage of threading both ends at once, cutting right and

and running 12 hours per day at that. A triple chuck machine can be made which will thread about 2000 tubes per day.

Franklin Institute Lectures.—Among those who will lecture before the Franklin Institute, in Philadelphia, during the coming season are: Prof. Louis M. Haupt, on "The Feasibility of Underground Rail-

figures relating to the Mahoning Valley iron interests: "The paid-up capital and surplus employed in the Mahoning Valley is \$4,583,800, an average of \$270,000 for each manufacturing plant. For the year ending June 30, 1888, the value of the product was \$13,607,794.70. This immense output required the services of 5048 men. There were paid out for wages \$3,016,245.36, or more than \$600 per annum income for each person, which includes boys and very many common laborers of small earning capacity."

Treasury Decisions.

Wire mattresses, notwithstanding the fact that they accompany bedsteads, do not come within the scope of the provision in Schedule D (T. I., 230) for "house furniture," but are dutiable at the rate of 45 per cent. ad valorem, under the provision in Schedule C (T. I., 216): *Provided, however,* That such rate is equal to or greater than the rate fixed by paragraph 182 for iron wire of the size of which the mattresses are manufactured.

Short pieces of brass curb chain, although they may be intended to be completed for use as watch-chains, cannot, in their present condition, be regarded as watch-chains, and, accordingly, are held to be dutiable at the rate of 45 per cent. ad valorem as unenumerated manufactures of metal, under the provisions of Schedule C (T. I., 216).

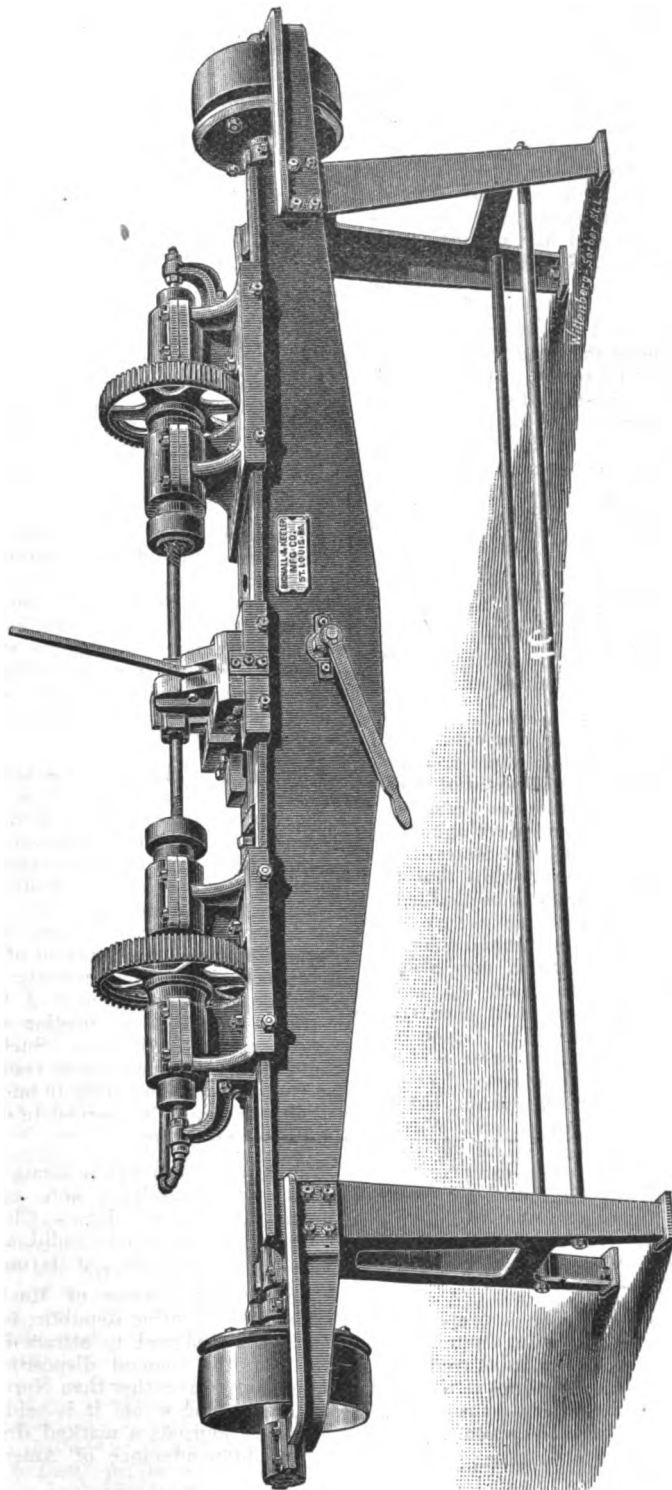
Razors with blades of regular patterns, and with finished handles, are held to be dutiable at the rate of 50 per cent. ad valorem, under the special provision in Schedule C (T. I., 207) for "razors," notwithstanding the fact that the blades are not ground and polished.

Silver-plated hooks, bars and swivels, intended for use in the manufacture of watch-chains, but which may be used for various other purposes, cannot be considered as coming within the scope of the provision in Schedule N (T. I., 459) for "jewelry of all kinds," but are held to be dutiable at the rate of 35 per cent. ad valorem, under the provision in Schedule C (T. I., 210) for "plated * * * articles."

Tin Nails.—We were recently shown a number of nails made from tin plate and sheet-brass scrap by a machine built by the Ferracute Machine Company, of Bridgeton, N. J., and which, at present, is being further improved upon. The nails are punched up from suitably cut blanks, and can be used for all purposes to which the ordinary forms of nails are adapted. They drive well in hard wood, and in point of cost will, no doubt, offer additional inducements. Both the nails and the machine by which they are made are of great interest, and we shall have occasion to again refer to them more at length. Mr. Oberlin Smith, the president of the Ferracute Company, is giving his personal attention to the work of perfecting the machinery.

The through rates from Baltimore to St. Paul and Minneapolis over the C., B. & Q. are: First-class, \$1.02; second, 91 cents; third, 74; fourth, 48; fifth, 41; sixth, 33; iron less than carloads, 38 cents; in carloads, 30 cents. These have been made the maximum rates, and will apply to all intermediate points, except when the through rate is less local rates will be charged.

Announcement is made that the Mann Boudoir and Woodruff Sleeping Car Companies have consolidated under the title of the Union Palace Car Company, with a capital stock of \$3,000,000.



AUTOMATIC RADIATOR TUBE THREADING MACHINE, BUILT BY THE BIGNALL & KEELER MFG. COMPANY, ST. LOUIS, MO.

left-hand threads. The tubes are first cut off in another machine to exact lengths and then threaded, the machine will thread tubes from 12 to 48 inches in length inclusive. It is automatic in its operation and can be run for hours without stopping. It has an automatic oiling device which keeps the dies constantly flooded with oil. The double head or single machine it is claimed will easily thread 600 tubes a day of 10 hours. The Kansas City Radiator and Iron Foundry Company are threading 70 tubes per hour,

roads in Philadelphia," on November 5; John Birkinbine, on "Pig Iron," on November 26; W. M. Barr, on "Interchangeable Work," on January 14; R. W. Hunt, on "The Manufacture of Steel Rails," on January 21; Dr. C. B. Dudley, on "Bearing Metal Alloys," on February 4, and Andrew Carnegie, on "Industries of Pennsylvania," on March 18.

In the course of a speech Mr. J. G. Butler, Jr., of the Brier Hill Coal and Iron Company, gave the following interesting

THE WEEK.

The manufacture of cotton in the South gains in importance from year to year. The Southern Atlantic States, with a production of about 1,750,000 bales, consumed last season 343,042, or one-fifth their production, in their own mills. This is certainly a good showing for an industry originating almost wholly since the war. It is gradually extending from that section to the Southwest, where the bulk of the crop is now produced.

The National Board of Steam Navigation elected officers for the ensuing year, as follows: President, A. C. Cheney, New York City; first vice-president, B. D. Wood, New Orleans; second vice-president, F. A. Churchman, Philadelphia; treasurer, Addison Lysle, Pittsburgh, Pa.; secretary, J. W. Bryant, New Orleans; assistant secretary, Charles H. Boyer, New York City; executive committee, James S. Negley and W. W. O'Neil, of Pittsburgh, Pa.; J. B. Coyle, of Portland, Me.; J. W. Miller, of Providence, R. I.; D. M. Munger, F. W. Vosburgh, H. F. Dimock, H. A. Bourne, I. L. Fisher, C. W. Woolsey and M. E. Staples, of New York City; G. W. Pride, Sr., of Philadelphia; A. M. Halliday, of Cincinnati; H. C. Hoarstick, of St. Louis, and C. P. Truslow, of New Orleans. A resolution was adopted that the next annual meeting be held at Pittsburgh, Pa., on the first Tuesday in October, 1889.

The sundry civil bill provides for the expenditure of only \$4,000,000 on the new Congressional library building, and the chief of engineers in charge says the limit fixed by law will be adhered to, as the structure will cover less space than was originally intended.

The Brotherhood of Railroad Brakemen has a membership of 14,000.

The Manchester *Examiner* says that although £3,000,000 was the authorized capital for the combination of British salt mining interests, about twelve times that amount was subscribed before the subscription lists closed.

Thomas Axworthy, the trusted treasurer of the city of Cleveland, is one more added to the list of defaulters. The deficit is not far from \$500,000, and an amount equal to this sum he is believed to have lost in the "Old Hutch" wheat deal. It is also reported that he lost heavily in the Gogebic iron mining venture, and he was caught in the same wheat corner in Chicago that brought Harper to grief.

Two barks in Philadelphia are loading with locomotives for lines of railway in Brazil and the Argentine Republic, all of which were built by English capitalists, but are equipped with American engines. The first-class cars for the same railways are manufactured in Wilmington, Del.

William H. Walbaum, senior member of the firm of Walbaum & Co., iron brokers in Philadelphia, was killed by falling from the cars on the Pennsylvania Railroad near Menlo Park. He was born in England, and was about 38 years old.

The heavy losses recently sustained by builders in New York, as the consequence of an overloaded market, have led to the adoption of a new device for mutual protection. The builders have commenced forming companies, composed of the builders themselves and their mortgage holders, for the purpose of carrying the imperiled property and preventing its sacrifice by foreclosure or forced sale. So far as this scheme has been tried it works well. It is essentially a scheme for co-operation, and it is consistent with methods that seem to be growing in favor with business men in all departments of the market. It is not

precisely a trust, since only the persons compromised in the transactions of a single building firm are made partners in the combination; but it will serve some of the ends of a trust if it can remove the danger of immediate foreclosure, and help to tide over the time while builders are waiting for the return of a normal market.

The late John Wentworth, of Chicago, left real estate valued at \$1,125,000; also \$375,000 in personal property.

A legal contest has arisen among the heirs of the late John Roach, iron steamship builder, respecting the distribution of property under the will. The plaintiff alleges that William Henry Roach, having been especially trained and educated for the purpose, was in 1864 taken into partnership by his father, the firm becoming John Roach & Son. Upon William Henry's accession to the firm the business began to prosper, and at the time of his death in 1872 it was worth \$1,500,000. This growth was due, it is alleged, to the efforts of William Henry Roach. When William Henry died his father continued the business under the same firm name, but made no accounting to the widow of William Henry of her husband's share in the business. The petition sets forth that the deceased husband was entitled to one-half interest in the property remaining.

A German syndicate, in which strong banking interests are represented, are said to have obtained from the Venezuelan Government a concession for a railway from Caracas to the sugar and coffee plantations in the interior. Like the scheme for the encouragement of French colonization, the ultimate object, we surmise, is to check English encroachments on disputed territory.

Captain J. W. Miller, manager of the Stonington Steamboat Company, read a paper before the National Board of Steam Navigation on the Nicaragua Canal as a means of extending and developing the coasting trade of the United States. The carrying capacity of every ship that now goes around Cape Horn will be doubled by the canal, as she will make two trips through the canal to one around the cape. Our coasting vessels, which now stop at the line of Texas on the East and Lower California on the West, will then trade from Maine to Alaska. The region covered by the local shipping interests of the United States is already greater than that controlled by any foreign nation, but the separation of our Eastern and Western coasts has tended to develop railway transportation, while the ocean-carrying trade has been gradually engrossed by foreign ships. The Nicaragua Canal will give us control of traffic over a coast line of 8000 miles, in which there can be no foreign competition.

An excursion to Mexico is proposed by the New Orleans Chamber of Commerce, in hopes of causing a diversion of trade from the European steamship lines terminating at Vera Cruz, but Mexican journalists do not speak hopefully of the scheme.

The records of the transactions of Congress during the session just closed show that the whole number of bills and joint resolutions passed was 1443, of which 1197 were approved by the president; 95 became laws without signature, 128 were vetoed and 23 failed for want of signatures at the time of adjournment. The enactments of a commercial nature comprised a bill for an international marine conference to promote safety at sea; a bill providing for a congress of representatives of American nations to discuss plans for commercial union, trade relations, &c.; bills to define the permissible marks on mail matter; establishing a Department of Labor; to carry out the treaty for protection of submarine cables; compel the

maintenance of Pacific railroad telegraph lines; to define the meaning of obscure provisions of our tonnage laws, and abolishing fees for the official inspection of steam vessels.

The will of the late Samuel J. Tilden, providing for the establishment of a public library, is sustained by Judge Lawrence, of the Supreme Court. The amount involved is said to be about \$10,000,000. An appeal will be taken.

The Coroner's jury in the case of the "Mud Run horror," on the Lehigh Valley Railroad, find the engineers and conductors alike guilty in failing to observe the usual precautions against a collision of trains.

Members of the New York Produce Exchange are endeavoring to carry into execution a plan for circulating the daily market quotations throughout the country. The plan, in brief, is to establish telegraphic connections with Chicago, Toledo, Detroit, Buffalo, Toronto, Cincinnati, Montreal, St. Paul, Minneapolis and Duluth upon a basis of a division of expenses with each of the above-named markets. Estimates are being secured, and it is thought that an annual expenditure in the aggregate of \$50,000 will accomplish the desired result. Of this amount, \$25,000 would fall to the share of the New York Exchange.

The complaint that the insulation of the electric wires placed in the subways has in some instances been destroyed by the escape of steam from the Steam Heating Company's pipes appears to have been well founded, but the engineers employed profess to believe that this difficulty can be remedied. A manufacturer of cables claims that cables can be made which will stand a test of 200° heat.

"Training for Trades" was the subject of a lecture delivered last week by John J. Tucker, of the Aqueduct Commission. He pointed out the manner in which young men had been drifting into clerkships and deserting the mechanical trades. Two reasons were assigned for this—the idea that a mechanical trade lowers the social standard and the abandonment of the apprentice system. The remedy he suggested was the establishment of technical or trades schools in connection with the city educational institutions. Such schools would elevate the mechanical trades. All the trades could be taught in one school, and a trade could be learned in one-third the time it now takes.

The Atlantic and Union dredging companies, of Brooklyn, and contractor Thomas Potter, of Jersey City, have formed a partnership to build a storage basin in New York Bay, at Bayonne.

The newspaper press of Mexico, like that of the Argentine Republic, is fruitful in schemes designed to attract immigration, but the general disposition is to invite Europeans rather than North Americans, respecting whom it is said there is "in some journals a marked dread of a possible preponderance of American influence."

Admiral D. D. Porter has made his annual report to the Secretary of the Navy. He says he regards sailing vessels as the best practice ships afloat, and that, while a couple of steamers might well be employed as gunnery ships, the Portsmouth, Jamestown and Saratoga should be retained in the navy for the purpose of giving the apprentice boys an extended voyage to sea. On the subject of torpedoes the Admiral says that for years he has doubted the efficiency of the Whitehead and other fish torpedoes, and he adds: "The torpedo, no doubt, can be made a powerful adjunct to other naval appliances, but, as matters now stand, the Mobile torpedo

would be comparatively useless against heavily armored ships with power guns, which would hold their own, notwithstanding they might be hampered with nets enough to keep out a whale torpedo. Ships might have to pause for a while before torpedoes planted on the bottom, but the stoppage would only be temporary, enabling the inhabitants of seaboard cities to move inland with their portable effects. Great ships with great guns will command the situation, and, having once effected an entrance into the harbor, can, by aid of the electric lights, send a party of divers to the bottom and cut the wires connecting submerged mines. These are at present the only torpedoes to be feared as very dangerous, and these become less formidable after having remained for some time under water. Our country more than any other stands in need of torpedo vessels of from 1600 to 2600 tons displacement until we can get our new navy fairly started. This class of vessels could be built much more rapidly than the cruiser or armorclad, their batteries to be not larger than 6 inch rifles and fitted with machine and rapid-firing guns. Hulls on the plan of the Polyphemus would be good ones with which to begin."

An industrial school for the training of boys is proposed by I. V. Williamson, a wealthy citizen of Philadelphia, which will rank in extent and educational importance with the great charity founded by Stephen Girard. Mr. Williamson has named a board of trustees to which will be intrusted the consummation of his plans, and is now engaged in the task of adjusting his securities so that his endowment will be of a permanent character. It is expected that the announcement of the intended gift will be made before the end of the year.

Augusta, Ga., is among the most prosperous of Southern cities. Trade has grown to a volume of \$68,000,000, an increase of \$9,000,000 in the past year. New river steamers have lowered rates to the coast one-third on cotton and produce, placing the city in a great measure independent of railroad consolidations. The building improvements the past year have reached \$1,500,000, and the tax digest for 1888 shows a total of \$20,000,000, an increase of \$4,000,000. The Augusta National Exposition opens November 8.

A corporation called the Massachusetts Dredging Company has been formed by New York and Boston capitalists for the purpose of dredging the Charles River and reclaiming the adjacent Cambridge marshes. The machine to be used was invented by a Russian named Alexey von Schmidt, who now lives in California. It not only dredges the channel of the river or harbor, but deposits the material on the shore by hydraulic pressure through iron pipes laid overland or across pontoons, and thus may be made to reclaim land a mile away.

The city of Chicago, otherwise known as the Lake City, if its population continues to increase as at present, will soon contain as many people as all the rest of the State. Including its suburbs, Chicago now represents one-fourth the population of Illinois, and, it is estimated, will cast 180,000 votes at the coming election, as compared with 570,000 in the rural counties.

Clausen's brewing establishment in this city was sold to an English syndicate for \$4,500,000.

The Governor of Utah reports an increase of only about 60,000 souls in that Territory since 1880. The manufacturing industries of the Territory are said to be in a satisfactory condition, and, taken as a whole, the year has been a prosperous

one. The aggregate mineral product of the Territory for the calendar year 1887 is given as \$7,637,729, of which \$5,976,884 was silver.

It is said that the total cost of the improvements making this year on the Pennsylvania Railroad will be near \$2,000,000, a large part of the expenditure being for third and fourth tracks and steel rails.

A grand scheme to promote immigration from Europe to the Southern States is being promoted by agents of the principal lines of Southern railroads, who held a meeting in Louisville a few days ago, with this object. It is proposed that the West India and Pacific Steamship Line, running from Liverpool, shall, like the big lines to New York, carry emigrants, landing them in New Orleans, to be distributed by the several railroad companies to whatever part of the South, West or Pacific slope they may desire to go. The expectation is that a considerable share of the trade may be diverted from Castle Garden.

The keel of the naval vessel Maine was laid unostentatiously at the Brooklyn Navy Yard on Thursday. She will be the largest and most powerful vessel yet undertaken for our navy. She will have a length between perpendiculars of 310 feet, an extreme breadth of 57 and a mean draft of 21½, with a displacement of 6648 tons. Her engines will have an aggregate of 8750 horse-power, which should give her a speed of 17 knots. Her armor belt will be 11 inches thick and her turret and breastwork only ½ inch less. Her main battery will consist of four 10-inch and six 6-inch breech-loading guns, the former being in turrets; and, as these are placed *en échelon*, the whole four can be fixed directly ahead or directly astern.

At the Texas State Fair may be seen one of the spades used by the Pueblo Indians in cutting the irrigation ditches at Ysleta, Tex., in 1540.

"Uncle" Rufus Hatch expressed himself on 'Change in reference to the big wheat deal and the manner in which foreigners engage in transactions of this character. While in Chicago last week he said: "Seven-eighths of the loss was by foreigners, through their New York correspondents. The foreigners have been domineering our wheat market for three or four years, and I am glad to see them get the worst of it. The speculation in Berlin, Vienna and Liverpool has been immense. The regular importers of wheat have been gambling in American markets and making enough to pay the freight on their importations. The method was to buy cargoes of wheat in Australia or India and then sell for future delivery in Chicago. They would make 2 and 2½ per cent. a month and come out with enough to pay the freight on their cargoes. They were always short and had a notion that the wheat crop in America was illimitable. The Almighty sent a frost a little earlier this season and the foreigners were nipped. They don't understand it, and lots of them are short now. They will find it out in six months."

All measures designed to exterminate those powerful monopolies known as trusts, or at least to counteract their evil effects, are left in abeyance until after the election. Respecting the future one of our commercial contemporaries remarks: "In the quieter and more rational period, which we hope will follow the election, men of both parties in Congress, yielding to the demands of their wronged and indignant constituents, ought to join in finding out constitutional and effective ways of rendering powerless the copper trust, the sugar trust and the rest of the monstrous brood. And in this excellent work may we not

count upon the assistance of legislatures in passing stringent laws, if required, to meet the emergency, and also upon prosecuting attorneys to enforce existing laws against those illegal combinations, which are only old offenders now robbing the public under the alias of trusts? There is really no reason why officials of all parties, being safely installed in their seats at Washington or at the State capitals, should not unite in a grand hunt for the extermination of trusts."

The tow-boat business of New York harbor represents an investment of several million dollars. To build a tug costs all the way from \$12,000 to \$50,000. From figures furnished by the local inspectors of steam vessels, whose duty it is to keep track of tugs as well as of all other steamboats, it would seem that there are now employed in the river and harbor something like 300 tugs. Estimating that the cost of building these tugs is, on an average, \$15,000, it will be seen that the money sunk in their construction foots up in round figures the enormous amount of \$4,500,000. And that, tow-boatmen say, falls far short of the mark. Fully 80 per cent. of the business is controlled by corporations. Most of the great railroad lines, for instance, do their own towing and own their own tugs.

The great manufacturing city of New ark shows an enrollment of 37,932 on the registry lists, against 32,270 in Jersey City, which is given by the census a larger population.

M. de Tchihatchef, a writer in one of the French newspapers, asserts that the average flow of petroleum in the Baku region is 88,000 barrels per day, as against 25,300 in the United States. The chief drawbacks encountered by those who have worked the Baku oil fields have been lack of transportation, absence of fuel and want of cheap packages. A railroad built across to Batoum, on the Black Sea, opened two maritime routes to Europe and met the first difficulty; cars and vessels constructed to carry crude oil met the last, and enabled the refineries to be built in the interior of the empire wherever fuel might be cheapest. It is confidently predicted, since the completion of the Batoum railroad, that Russian oil will displace American in the European markets, and that it will even be possible for the Russian product to compete for the markets of the United States. M. de Tchihatchef points out a probable demand in the near future for petroleum to serve as fuel on the great lines of railway completed and still building in Asia. He sums up the case, as made up by him, with the words: "It must be admitted that the enormous advantages which Russia possesses over the United States must necessarily lead one day to a complete victory over her present powerful rival."

Work has commenced on a great overflow dam in Paradise Cut, 15 miles south of Stockton, in the San Joaquin River, California. The dam will be 250 feet long and 40 feet high, and will be made of timber, with earth filling. The intention is to keep the strong current of the San Joaquin in the main river channel, thus scouring it out and aiding navigation.

The iron steamship Atlas, built in 1873, at Dumbarton, Scotland, and which had just arrived from Costa Rica with a cargo of coffee, logwood and bananas, was run into last week by the ferry-boat Central, off the foot of Barclay street, in this city, and sunk in five minutes. The ferry-boat penetrated about 10 feet, the iron plates seeming to offer little resistance. The steamer was valued at \$100,000 and the cargo about \$45,000.

MANUFACTURING.

Iron and Steel.

The nail factory of the Belmont Nail Company, at Wheeling, W. Va., is in full operation, with the exception of the small nail machines, which are idle for an indefinite period. The report that a strike had taken place at this mill is without foundation. The Belmont, like several other nail mills and tack factories in the country, desired to place itself in a position where it could compete in the market on small nails. This cannot be done unless a single feeder runs eight machines, as in tack factories, instead of four, as in nail mills. No reduction in price was demanded. The small machines, at the Belmont are located in an annex, separate and apart from the other machines but under the same roof. A proposition was made to the men who run these small machines that they be run hereafter on the tack factory basis. At first they consented, but afterward reconsidered the matter and declined for the present, when the machines were closed down, and will remain closed until such time as the men can agree that they may be run upon a basis that has been adopted by other mills and which will enable the company to meet a fair business competition.

Fannie Furnace, at West Middlesex, Pa., operated under lease by the Wheeler Furnace Company, of Sharon, Pa., is 60 feet high, 12 feet 2 inches at the bosh, and 8 feet at the tuyeres. The furnace was blown in last May, and has been running along at the rate of 80 to 90 per day, but for the last two weeks has averaged over 100 tons per day. For two days in succession it produced 106 tons. Ore yields 58.4 per cent., while 2031 pounds of coke is used to each ton of iron made. The furnace is equipped with iron stoves and a 72-inch blowing engine, made by Macintosh, Hemphill & Co., of Pittsburgh. There is also another small engine which is seldom used. The furnace is at present running on Bessemer, and since August 17th all the iron produced has been strictly No. 1, with the exception of one cast.

Northampton Furnace, near Freemansburg, Pa., operated by the Bethlehem Iron Company, of Bethlehem, Pa., was blown out on Monday, the 20th ult., and will remain idle until spring. In the meantime the furnace will be thoroughly overhauled and improved.

The Apollo Iron and Steel Company, of Pittsburgh, are operating their plant at Apollo, Pa., to its utmost capacity. The steel department is being operated double- turn, while the galvanizing department, which is the largest in the United States, has not been closed down for any length of time since it was built, over two years ago. Six pots are now in operation.

Moorhead, Brother & Co., of Pittsburgh, proprietors of the Vesuvius Iron and Nail Works, at Sharpsburg, Pa., are using coal gas made by a new process, which enables them to furnish fuel for a ton of iron at a cost of a little over \$1 for heating and puddling. A heating furnace in operation for several weeks has shown the cost in the heating process to be less than 60 cents per ton. Two new double puddling furnaces, which are to be furnished with fuel made under the same process, are about ready to be lighted. The new method will effect a saving of almost \$4 in making 10,000 pounds of muck bar in a quadruple puddling furnace, and nearly half as much in a double puddling furnace.

The Moorehead-McCleane Company, proprietors of the Soho Iron and Steel Works, at Pittsburgh, have contracted with the Lewis Foundry and Machine Company,

Limited, of that city, for the erection of a 16-inch skelp mill, which will enable the firm to make all sizes of skelp iron such as are made in grooves. Heretofore they have made some sizes on plate mills for the Pittsburgh Tube Company, in which the firm are interested. The completion of the new mill will enable them to manufacture all sizes required.

The Mahoning Valley Iron Company, of Youngstown, Ohio, are making a number of improvements which will increase their output considerably. The company are at present rebuilding their blast furnace, and have also built a new engine-house and pattern shop and placed several new boilers in the rolling mill.

Week before last Phoenix Furnace, owned and operated by Brown, Bonnell & Co., of Youngstown, Ohio, produced 804 tons of pig iron, which is the largest production in that length of time in the history of the furnace.

The Iron City Mfg. Company is the name of a new organization that has succeeded to the business of Geo. Y. McMurtry, manufacturer of hot-pressed nuts, at Pittsburgh, Mr. McMurtry having disposed of his entire interest in the business. Robert J. Taggart is secretary and treasurer of the new firm.

From a recent issue of the Franklin (Pa.) *News* we take the following: "An idea of the advantage of having industries in a town may be formed by a glance at the total amounts now paid out each month in New Castle, Pa. Some of the pay sheets are as follows: Johnston's Sheet Mill, \$20,000; Etna Iron Works, \$20,000; Witherow's Works, \$12,000; New Castle Wire Nail Works, \$10,000; Crawford Iron and Steel Company, \$6000; Oliver Bros. & Phillips, \$5000; Baldwin & Graham's Stove Works, \$4800; Etna Furnace, \$4000; Raney & Berger Furnace, \$4000; New Castle Paper Mill, \$1000; total, \$86,000."

From a recent issue of the Sharpsville (Pa.) *Times* we take the following information relating to the blast furnaces in the Shenango Valley: "Mabel Furnace has been making a phenomenal output of iron lately, and can lay claim to having the best record of any furnace in the valley. This furnace is making on average 120 tons of Bessemer iron a day, with a maximum daily output of 130, the latter amount having been made last Monday. This for a 65-foot stack will be hard to beat. The Claire Furnace is also making a large amount of iron, her best day's output being 147 tons of Bessemer. This furnace has a record of 896 tons per week. The Sharpsville Furnace, which was blown out some time ago, is undergoing extensive repairs which will largely increase the output of iron when it is again put in blast. The old bosh has been torn out, the salamander taken out and a new bosh is being put in. A new hot blast, of Pierce patent, is being built, and other improvements made which will take some time to complete.

The National Tube Works Company, of McKeesport, Pa., have commenced the erection of a new puddling department, to contain 20 puddling furnaces.

The Lehigh Iron Company, of Allentown, Pa., have recently blown in No. 1 furnace, which has been undergoing repairs.

The entire machinery for the new plant of the Roanoke Rolling Mill Company, at Roanoke, Va., has been almost completed by Wharton McKnight, proprietor of the Anchor Foundry, at Pittsburgh. The works have for some time been running full night turn, in order to complete the order in time to allow the new rolling mill at Roanoke to start up on January 1. Four engines, an 18-inch muck train, a

16-inch bar mill, a 10-inch guide mill, squeezers, shears and hot saws, all of which will be run by separate engines, have been already completed.

The Allentown Iron Company, of Allentown, Pa., last week blew in an additional furnace.

In our issue of September 18, last, we made mention of the fact that the plant of the Wheatland Iron Company, at Wheatland, Pa., owned by the Woods heirs, of Pittsburgh, and which has been idle for more than ten years, would resume operations in a short time. Last week a partial resumption of the plant took place, and it is expected that in a short time all departments will be in full operation. Skelp iron of large sizes will be the principal product, of which the plant will have a capacity of about 300 tons every 24 hours.

A report was published in the Pittsburgh papers last week, to the effect that Singer, Nimick & Co., Limited, steel manufacturers, of that city, had decided to make a reduction in wages. We find, upon investigation, that the report is untrue. This firm have refused to recognize either the Amalgamated Association or the Knights of Labor, but the men are employed with the understanding that the firm will always pay as high a rate of wages as any union mill in that city.

The Lloyd-Booth Company, proprietors of the Falcon Foundry and Machine Works, at Youngstown, Ohio, have just completed for the Warren Iron and Steel Company, of Warren, Ohio, a heavy scrap shear to cut up to 5-inch round iron cold. The shear is of a new pattern and modern design.

We are informed that the report that the supply of natural gas had been cut off from the mills of Brown, Bonnell & Co., of Youngstown, Ohio, is without foundation. The entire plant of this firm, with the exception of the nail factory, is being operated to its utmost capacity.

Some months ago McClure & Schuler, engineers and contractors, of Pittsburgh, fitted up No. 1 Furnace of Shoenberger, Speer & Co., of that city, with three Massicks & Crooke's hot-blast stoves. Since these have been in operation they have given entire satisfaction, and a few days ago the firm received a contract for three additional stoves of the same design to be placed in No. 2 Furnace. Work on these will be commenced early during the next month.

Edith Furnace, of the Edith Furnace Company, at Allegheny City, Pa., which has been out of blast since June 16 last for relining and repairs, resumed operations on Wednesday, the 24th ult. This furnace is operated under lease by the National Tube Works Company, of McKeesport, Pa., and its entire product, amounting to about 700 tons per week, is consumed by that firm.

A company is now being formed, and all the stock, \$250,000, is already subscribed, for building a 150-ton coke furnace at Toledo, Ohio. It will be a complete modern plant, costing, perhaps, \$200,000. Its product will be foundry and forge iron made from Lake Superior ores with Connelville coke. It is backed by Cincinnati and Southern Ohio and Toledo capitalists. All of the parties actively interested are experienced and successful iron men. It is expected that work of construction will be begun at an early date.

The charcoal iron furnace of the Appleton Furnace Company, at Appleton, Wis., was burned on the 28th ult.

Messrs. Matthew Addy & Co., of Cincinnati, inform the *Bulletin* of the Iron

and Steel Association that Pioneer Furnace, at Thomas, near Birmingham, Ala., of which they are the agents, made during the week ending October 6 787 gross tons of pig iron, 89 per cent. of which was foundry iron. This is an increase of 37 tons over the highest previous weekly make. Since the furnace was put in blast last May it has made less than 1000 tons of forge iron.

Machinery.

The Stearns Mfg. Company, of Erie, Pa., are still adding to their boiler and engine works, which now cover an area of 6 acres. They commenced business in 1887, and have since that time built and equipped: 1. Machine shop, 80 x 300 feet, with floor space of 39,000 feet, provided with a splendid 15-ton crane, which commands the whole length of the building. 2. Smith shop and boiler rooms, 50 x 147 feet, with 7350 feet floor space. 3. Boiler works, 80 x 200 feet, with floor space of 16,000 feet. 4. Foundry, 85 x 200 feet, floor space 17,000 feet. 5. Carpenter shops and storage rooms to balance of territory. The buildings are all especially adapted to their uses, and, altogether, make one of the most valuable and sightly plants in the country. They employ 450 hands, and are taxed to the utmost to meet their orders.

The Hyde Iron Works, of Bath, Me., formerly known as the New England Marine Engine and Machine Works, have resumed operations. Only a few men are employed, but it is probable that a full force will be engaged soon. These works will be run in connection with the Bath Iron Works.

Last week the Westinghouse Electric Company, of Pittsburgh, concluded the establishment of two electric light plants, numbering together 1100 16 candle-power incandescent lights. One of these plants is at Tyler, Tex., with 650 lights, and the other at Clinton, Ill., with the same number.

H. K. Porter & Co., of Pittsburgh, builders of light locomotives, have received an order from the Japanese Government for two Mogul 42-inch gauge locomotives to be used on the Paranai Railroad in the island of Yesso. This line is of the narrow gauge standard adopted by English engineers for India and some of their other colonies. H. K. Porter & Co. are the first locomotive builders in the United States who ever sent an engine to Asia. Formerly English manufacturers had the exclusive trade, although later on some French locomotives were sent there. Their first consignment was in 1880 for two locomotives; the second, May, 1881, for two locomotives also; the third, May, 1884, one locomotive; the fourth, January, 1885, two locomotives. The present order will be completed by February, 1889, and shipped.

The Indiana Machine Works have been incorporated at Fort Wayne, Ind., with a capital stock of \$75,000. J. C. Peters and others are the incorporators.

The Grant Locomotive Works, of Paterson, N. J., are considering the subject of moving to some Western point "for business reasons"; but W. W. Grant, when questioned on the subject, was not disposed to speak more specifically about it just now. Minneapolis, as well as Chicago, claims to offer superior advantages as a new location.

The Williams & Orton Mfg. Company, of Sterling, Ill., have opened an office at 152 Lake street, Chicago, for the sale of the Charter gas engines. These engines were awarded the medal of superiority by the American Institute, New York, in 1886. They are suitable for running passenger and freight elevators, printers'

machinery, pumps, saws, lathes, sewing machines, fans, coffee and spice mills, and for other service requiring from 2 to 25 horse-power. The company have issued an illustrated circular describing the engine and giving a large number of testimonials respecting its efficiency and economy.

The Hughes Steam Pump Company, of Cleveland, Ohio, report an active business in their line of manufactures. They have recently made extensive additions to their establishment and are now running a largely increased force of men night and day.

Mr. A. Mugford, of Hartford, Conn., who is no doubt well known to many of our readers as a wood engraver and printer, has just issued a new copy of his catalogue, which he calls "The Manufacturers' Exchange," and which contains specimen impressions of wood cuts recently turned out by him for different manufacturers. The engravings are, without exception, well executed and readily commend themselves to manufacturers.

At the Centennial Exposition of the Ohio Valley, in Cincinnati, the Waterhouse Electric and Manufacturing Company, of Hartford, Conn., were awarded a gold medal and two silver medals on their arc light plant exhibited. The company are to be congratulated on receiving their second gold medal, the first having been awarded at the Mechanics' Fair, Boston, in December last.

The Egan Company, of Cincinnati, Ohio, are at present building a large line of special machines for finishing and polishing wood surfaces, notably sand-papering machines, which, we understand, are ingenious and simple in construction. It is of some interest to note here, also, that at the Cincinnati Centennial Exhibition the company received medals of superiority on all the machines which they had entered for competition—namely, their No. 4 planer and smoother, dove-tailer, slot tenoner, wood-worker and molder, combined band and scroll saws, shapers, &c.

The Ball Electric Light Company, of New York, report recent sales amounting to 1095 arc lights.

Hardware.

Articles of incorporation were filed in the recorder's office in Kansas City, Mo., October 8, by the Western Electric Lock Company, with a capital stock of \$100,000. The purposes for which the corporation are formed are to manufacture, sell and deal in the Gill electric combination lock in all its various applications in connection with railroads, telegraphs, telephones, military and naval purposes, police and fire departments. The company will also deal in all other electrical contrivances of this character. The incorporators are Benjamin F. Jones, Edward L. Martin and Alfred W. Jones.

From a recent issue of the Reading (Pa.) *Times* we take the following account of the works of the Reading Hardware Company, which were destroyed by fire some time since:

The work of rebuilding the Reading Hardware Works is steadily going ahead, though not so rapidly as it would were the weather more favorable for building operations. Every precaution that time, skill and money have been able to secure in the way of putting up an entirely safe and thoroughly fire-proof structure is being employed. With this in view the enterprising management is availing itself of every valuable architectural improvement known in the construction of large industrial establishments. The isolation of some of the buildings heretofore connected; the absence of joists, which present so much surface for combustion; the introduction of iron doors and shutters; the connecting of the different buildings by means of iron bridges, together with other devices for preventing the spread of fire, are among the improvements contemplated.

The present necessarily limited capacity of the works is taxed to the utmost in the production of goods for the trade. In addition to this the Manhattan Works leased by them, and employing some 300 hands, is turning out work as fast as possible. Large heaps of burnt castings, running into tons, are still on the premises as terrible reminders of the severity of the conflagration which laid in ashes one of the largest and most prosperous industrial establishments in the country. With favorable weather the works will soon be rebuilt. When that shall have been accomplished, and with the introduction of the latest improved machinery to equip the factory to meet all its varied needs, we may confidently look upon the new Reading Hardware Works as an institution in which every citizen will feel a just pride.

The American Wire Nail Company, Covington, Ky., will break ground at once for an extensive wire nail manufacturing plant, including a rod and wire mill, at Anderson, Ind. The new works will be situated within easy access to four lines of railroad, the C. C. C. and I., C. W. and M., Pittsburgh, C. and St. L. and the Midland. The site consists of 10 acres of land, upon which will be erected six large structures, consisting of wire mill, 85 x 285 feet, with which is connected a nail mill, 100 x 200 feet; rod mill, 100 x 260 feet; boiler house, 40 x 80 feet; machine shop, 50 x 100 feet, and carpenter shop, 50 x 100 feet. The machinery for the rod mill will be built by the Lewis Foundry and Machine Company, Pittsburgh, having a capacity of 100 tons per day. The wire machinery is to be built by M. Darragh, Fallston, Pa., having a capacity of 75 tons daily. Motive-power will be furnished by a 2000 horse-power poppet valve engine, made by H. Frisbie & Co., Cincinnati, the cylinder of which measures 48 x 60 inches, with band wheels, having each a 38-inch face and 22 feet in diameter, the combined weight of which will be 50 tons. The wire and rod mill building will be advanced as rapidly as possible, while work on the nail mill will be commenced early in the spring. The latter is to have a complement of 50 machines, which number will be added to as necessity requires. The entire plant will be completed about March 1, 1889, when 300 men will be given employment. The entire works will be illuminated with electric light. Fuel being one of the larger items entering into the cost of manufacturing wire nails, has urged the selection of Anderson for the location of the new plant. A natural gas well with 325 pounds pressure is now flowing on the property, which was donated to them by the city in addition to a generous bonus, while the new location is more centrally located to their trade in the North, West and Northwest, which territory is to be supplied from that point. The works at Covington will continue in operation to supply the local and Southern trade principally. The capital of the company has been largely increased by the admission of Messrs. Garvey Bros., of Covington, Ky. This will involve no change in the active management of the business affairs of the concern, Mr. L. H. Gedge occupying the position of president; Mr. E. J. Buffington, treasurer, and B. H. Gedge, vice-president and secretary.

The Whitney Gun Company, of Northampton, Mass., have most of their tools made and are now engaged on several guns that will be used as samples, and after their introduction the general manufacture of the arms will be begun.

At a meeting of the stockholders of the Bryden Horse Shoe Company, Limited, of Catasauqua, Pa., held in that place on Thursday, the 25th ult., it was decided to increase the stock of the corporation. It is intended to erect new works and enlarge the plant considerably. The new works will be in operation about the 1st of December next.

The Iron Age

New York, Thursday, November 1, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The growing importance of the interests of *The Iron Age* in St. Louis and in the flourishing territory tributary to it has led us to open a branch office in the Commercial Building, 212 North Sixth street, St. Louis. Mr. H. H. Roberts, who has assumed charge, is long and favorably known to many of the friends of *The Iron Age* in the East, through his connection with the Philadelphia office. He thus brings to his new field a correct appreciation of the requirements of our patrons, so that it remains for him to overcome only the difficulties incident to a change of locality. We bespeak for him the confidence he deserves and the support he will strive to merit.

Competition and Protection.

Competition is not the simple matter that some "students of maxims instead of markets" seem to imagine. As we infer from their utterances, they conceive that two or more manufacturers (the more the better) compete for a given market. Competition cheapens prices, of course, and improves quality at the same time. As soon as a manufacturer cannot sell at a profit goods of the required quality competition ends. He withdraws from that market, and, if he can command no other, "seeks a more profitable occupation"—in which non-productive, transitory state of "seeking" these theorists, if they had their will, would keep a large proportion of the capital and labor of the world all the time; for it is to them as plain as A B C that the process forces everybody into "profitable occupation." But the competition which business men most fear begins just where these amateur economists think it ends, and the situation which they fancy drives the competitor out of the market really makes him, on the contrary, the most dangerous of adversaries in it.

Not to refer at all to actually insolvent concerns, who are merely keeping paper afloat, competition has five stages, in which its objects are respectively, profit, interest on capital, general expenses, repair and guarantee funds, and, finally, primary cost—i. e., the mere cost of the materials of manufacture and the wages of manual labor employed. It is the latter element only which figures in political editorials and stump speeches as "cost," and not infrequently it is subtracted from the market quotation of gross selling price, to ascertain the "profits" of the bloated employer. In the first stage above mentioned, competition cannot kill. Some manufacturers may thrive better than others, but all get along. The result, of course, is that in every line of business, if the conditions are only fairly favorable on the average, a few men or firms can be pointed out who have amassed great fortunes by reason of specially favorable conditions not possessed by their fellows. To attempt to bring down

their profits by any measure affecting the whole business would merely kill off their competitors and leave them a monopoly. The firm of Mr. Andrew Carnegie, for instance, possess an advantage in their own natural gas wells, possibly surpassing in amount the total profit of some of their competitors, and the location of their works at Pittsburgh secures to them, besides, an additional protection of several dollars per ton of product against foreign competitors. The ardent politicians who would like to strike Mr. Carnegie through the tariff ought to know that they will have to kill half a dozen great enterprises before they can even worry him. For he is, at all ordinary times, competing in the realm of profits merely.

As competition grows sharper, and in intervals of slack demand and low prices, the fight is for interest on capital. Here the financially weak, who are operating with borrowed capital, may go to the wall. But our great solvent concerns are prepared to forego not only profits, but a part or the whole of the interest on their capital, rather than abandon the field, or even suffer the injury and loss of prestige due to a temporary stoppage. It is in the next stage, however, that, as prices fall still lower, the real life-and-death battle begins. The general expenses are items which must be paid, as truly as the wages of the immediate producers; but the difference is, that the former would go on in nearly the same ratio, even if the manufacture were temporarily suspended. It costs so much a month for mines or iron works to stand still; and, unless the suspension is made intentionally for a very long time, this sum cannot be reduced. Rather than incur the evils of stoppage, the manufacturer will therefore endure the loss of part or all of the general expenses. Beyond the constant items of general expense come the provisions for repairs, renewals, bad debts, &c. These, of course, ought to be kept up, but rather than suspend operations they will be omitted from the calculation, and the product will still be made and sold, though it does not bring more than its primary cost.

The last and most desperate struggle of all comes when the market price of the product would not replace the material and labor actually in it. In pig iron this point would be reached when the price obtained for a ton of pig would not buy the ore, coal, and limestone, and pay the actual furnace labor necessary to make another ton. As an economic proposition, no wise manufacturer would feel justified in entering this stage at all. But as a business proposition, every manufacturer of a non-patented article may have to do it sometimes, and many must do it often. They are, of course, impelled by the hope that the necessity will be but temporary, but in many instances it lasts a long time. We have heard of single English houses selling below cost for years, in a particular market, and losing \$1,000,000 outright, rather than permanently surrender that market. American manufacturers have often shown the same spirit. If they obeyed the laws of political economy, and shut down their works every time the business was not profitable, their workmen would lead sorry lives. "No orders" does indeed shut many works at times, but orders at low prices are always eagerly

taken to keep the works running. The prices paid for a large part of the elevated railroad work in New York and Brooklyn, for instance, could not have covered general expenses and renewal funds, if, indeed, they covered primary cost.

Now, it is in the last two or three stages of the competition we have sketched that manufacturers need protection most, if they need it at all. And the principal objection to the notion of a strictly revenue tariff with "incidental protection" is that such incidental protection operates most when least needed and *vice versa*. For it calls for ad valorem duties, which are lowest when prices are lowest. But no protection is or can be given against home competition. Why should it be given against foreign rivals? Bethlehem, Troy and Scranton are not protected against Carnegie; why should they be guarded from Dowlais?

This is a fair question, to which the complete answer is complex. We wish to emphasize a single branch of it only—namely, the impossibility of foreseeing and providing for desperate foreign competition. The home situation we can watch. We can see the influences at work. So far as they result from Federal legislation, they are common to all American works, or, if injustice is done to any locality or business, appeal can be made to our own Government for a remedy. But we can neither foresee nor control the cause which may suddenly determine a foreign manufacturer to ship his unsaleable surplus stock to this country, and sell it here below cost in order to stiffen the prices of his home market. Perhaps some event in Egypt or India, reacting on the English money market, has affected particular establishments there, the American competitors of which did not dream that Egypt or India would thus indirectly bring a conflict upon them. This is scarcely a fancy. We have known of a large English operation connected with the iron business suddenly influenced, disastrously to American interests, by a panic in Turkish funds. It is in hard times, when dull trade has made competition among makers desperate, that this unforeseeable, unpreventable, uncontrollable foreign incursion is most to be dreaded. And no matter how long an industry has been established, it needs to be protected at this weak point so long as it has a higher "primary cost" than its foreign rivals. The function of a tariff in encouraging "infant" industries is another thing. Perhaps that may require much higher duties than the function we are now describing. We are not now concerned to inquire how high the duty should be in any given case or how this question should be examined. In other words, when our own manufacturers are standing against each other face to face in a struggle for primary costs, they should be safe against flank and rear attacks.

As prices rise and competition is carried into the spheres of interest and profits, the duty which was prohibitory before need not be prohibitory any longer. In these departments a fair fight is not feared by Americans. It will be seen that these conditions are met by a specific duty only, which thus appears, apart from its efficiency against Custom House frauds by undervaluations, to be the true means of a judicious protection. An ad valorem duty.

on the other hand, is either too high when prices are high, and favors "corners," to the injury of both the trade and the public, or it is too low when prices are low, and makes disaster more disastrous, operating thus at both ends to increase the oscillation of prices which disorganize and demoralize business.

The Business Cost of Pig Iron.

The statement of the items which enter into the cost of making pig iron has given rise to considerable discussion among those who conduct blast furnace enterprises, and is often utterly inexplicable to the outsider. The cost comprises:

1. The cost per furnace books.
2. The extra cost due to contingencies, accidents, interest on supplies carried, and interest on plant.

3. The selling expense, which includes the interest on the stock of pig iron carried unsold, the interest on sales from the date of sale to the date of payment, the guarantee fund for bad debts, the brokerage, the office expenses and the cost of loading on cars, since sales are usually reckoned at a price f.o.b at the works.

The first item is what is commonly included in the so-called estimates of the cost of pig iron issued by the promoters of new enterprises and adopted by amateur economists. Often these estimates do not even cover what the cost per furnace books should really comprise—namely, the cost at the furnace of ore, fuel and limestone, wages, salaries, supplies, and a renewal fund of such an amount per ton of pig iron as will on the average suffice at the end of the blast to put the furnace and machinery in good order for another. In cost sheets made for the information of proprietors only there should be also always an allowance for the inevitable shortage in fuel. Limestone is generally used from hand to mouth, and there is less chance of mistake or waste in regard to quantities. Ore is often accumulated in large quantities, and, being charged in small quantities, it is not likely that at the end, perhaps of several years, when an ore pile happens to be cleared up, the aggregate of the charges made by the barrowful will precisely equal that of the shipments received from the mines. The dump may overrun or fall short, and the precise fact may not be determined at the end of each year when the annual cost sheet is made up. It is impossible, therefore, to make allowance for it under this head, and it is usually omitted here and placed under the head of contingencies. But the fuel account is sure to show a deficiency by reason of the waste of coal and coke in handling, the dust not being charged into the furnace. The percentage of this deficiency varies according to the method of transportation and delivery, the amount of surplus stock of fuel necessary to be carried, &c. It is never safe, we think, to put it at less than $2\frac{1}{2}$ per cent. on the amount of fuel reckoned by the number and weight of charges, and 5 per cent is a common and reasonable figure.

The renewal fund is another variable item, the amount of which must be fixed by experience. In prudent practice it ought to include a reasonable amount of improvements. At the end of a blast it is not only necessary to reline the furnace, patch the boilers and put the plant as

nearly as possible in the same shape as at the beginning. This is the time when the ironmaster improves his tuyeres and connections, hot-blast stoves, and plant generally; and while the renewal fund is not expected to cover extensive reconstructions, it should cover such minor improvements incidental to repairs as experience has dictated. Of course a short, unlucky blast leaves an inadequate renewal fund, while a long and successful one accumulates more than is immediately required. We are satisfied that 50 cents per ton is not too much, and we know this is the amount charged to this account by some experienced managers. It is a mere question of bookkeeping, and some people prefer to put all such items in a construction account, which, if not properly considered, may lead simply to the steady increase of the fixed capital, and the final collapse of the business after years of delusive prosperity.

But when the cost sheet according to the furnace books has been honestly and safely made up, say at the end of the year (thus checking the weekly and monthly reports which all well managed works require as an approximate indication), there remain the other items we have enumerated. With regard to these we submit the following figures, taken from the books of a well-known, well-managed and solvent concern, and based on the actual business of a fairly prosperous and very recent year, during which many thousand tons of pig iron were made and sold. The items of interest have been calculated at 6 per cent. Careful analysis made by an expert and entirely disinterested accountant, shows the following result:

Extra cost and interest on plant and inventory.—The shortages discovered at the end of the year in old ore-dumps, &c., amounted to 38 cents per ton of pig iron made. But this was extraordinary, and it is estimated that for 15 years past, a fair average would be about one-third as much, or, say:

	Per ton.
Shortages and accidental losses, not otherwise accounted for.....	\$0.12
Interest on inventory of ore, fuel, and supplies.....	.34
Interest on plant.....	.54
Total.....	\$1.00

It will be observed that the first item is arbitrarily assumed, at a low figure, and that to this assumption only is due the suspicious roundness of the total.

Selling expenses.—These include the following items:

	Per ton.
Interest on stock of pig iron.....	\$0.84
Interest on sales, 30 days.....	.09
Guarantee fund for bad debts.....	.27
Brokerage at 1 per cent.....	.17
Office expenses (not at works).....	.06
Loading expenses.....	.15
Total.....	\$1.08

The interest on an average stock held an average of four months was calculated, not on the selling price, but on the furnace cost. The interest on sales is on the period of 30 days, allowed without the interest to purchasers for the settlement of accounts. The guarantee fund was deducted from the books for 15 years past and did not include exceptional instances.

The actual total of these two accounts during the year under consideration was \$2.34. But the total of \$2.03 which we have given is closer to the average of the

past 15 years. During that period, we may add, the concern in question has been obliged to increase its actual investment both in fixed and in floating capital to an average of more than three times what it started with. The present figure at which the property and plant stands on the books is larger than all the profits of the 15 years, without counting interest on capital at all; and if the concern desired to go out of business to-morrow the net result of the whole enterprise would depend upon its ability to find a purchaser at its valuation of the property, which, although it is far less than the amount actually expended in improvements, no sane man would be willing to pay, except for the purpose of continuing the business. In other words, this valuation represents far less than the cost of property and plant, and much more than its intrinsic value. It is its "business" value, so to speak, and a permanently unfavorable change in the business situation would seriously reduce it. The gradual increase of such business valuations is the effect of competition and progress, diminishing the profits of capital and imperatively requiring a larger and larger scale of operation. The concern to the courtesy of which we owe this glimpse into actual practice is now making, per furnace in operation, about six times as much pig iron as in 1873.

It thus appears that the business cost of a ton of pig iron is, in the case we have analyzed, at least \$2 more than the furnace cost. We cannot, of course, give names and details, but we can vouch for the accuracy of these figures, and from our knowledge of the general business we do not hesitate to say that they fairly represent the experience of really solvent enterprises in the manufacture of pig iron. Perhaps we should add that we have excluded from the above estimates the salaries of such officers as the president and secretary of the company, so as to make them applicable to individual concerns as well as incorporations. So far as such officials are ornamental, there salaries should come out of profits, and not be reckoned as part of the cost. It will be noticed, also, that the above estimates assume no difficulty in getting any required amount of money at 6 per cent.—a condition which a good many iron manufacturers would be glad to encounter. On the whole, therefore, while single items of the estimates may be deemed large by fortunate makers here or there, we feel sure that the general total does not overstate the burden carried by established and well-managed concerns in this business—and quite ignored by the smart statisticians who know all about it.

The unconstitutionality of the "drummers' tax" has been affirmed once more by the Supreme Court, the case decided by Justice Bradley being this time that of W. G. Asher, a resident of New Orleans, against the State of Texas. The State courts had upheld the local law making it a misdemeanor for any person to do business as a commercial traveler without first having taken out an occupation license. The State authorities held that there were differences between the Robbins Tennessee case, and urged, too, that the latter was in conflict with prior decisions of the Supreme Court. Justice Bradley seems to have disposed of these contentions very

briefly by holding that the Tennessee and Texas cases were practically identical, and that "the court has always supposed that a later decision has the effect of overruling a prior decision with which it may not be in harmony." Thus a vexed question appears to have been finally and decisively put at rest. Any taxing of a commercial traveler, a resident of another State, is a violation of the right of the general Government to regulate Interstate commerce.

A Court of Patent Appeals.

Among the measures of deep interest to the business community which did not come up for consideration of Congress is the House bill, No. 9084, relating to a proposed Court of Patent Appeals, which has been ably advocated by George Ticknor Curtis. Its double object is to secure some relief for the overburdened docket of the Supreme Court and to allow of more thorough discussion of patent, trade-mark and label cases. During the last term of the Supreme Court, 25 out of 325 were patent cases. Allowing two hours for each side for oral argument, and making a fair estimate of the time consumed in studying them and preparing the decisions, two months' work, at least, out of a term of eight months, was occupied by the highest court in the land, crowded as it is with important cases. It is urged with much show of justice that the greater part of the work thus devolving on the Supreme Court is the determination of questions of fact which could be as readily and as authoritatively decided by a special court, leaving the decision of questions of law to the highest tribunal. The testimony in patent suits is often very voluminous and conflicting, involving a wide variety of intricate mechanical and scientific subjects. Careful application to their study is expected to allow Supreme Court justices to master them without much difficulty, but certainly at a considerable sacrifice of time. No one who has even as an expert gone over the testimony in hotly contested patent suits will fail to appreciate the labor which an effort to master them must involve to one earnestly seeking to discover the truth.

To relieve the Supreme Court, and at the same time allow of an oral presentation of the facts not fettered by the present two-hour rule, the Patent Court of Appeals is proposed. It is not to be a board of experts, but it is to consist of three justices, lawyers, preferably men who have had experience in patent cases. They are to constitute an appellate court, to which, first of all, appeals from the decisions of the Commissioner of Patents in interferences are to go. As it is now, the inventor who believes that justice has not been done him in the Patent Office must appeal from its chief directly to the highest tribunal of the land. The proposed court would be a special and permanent tribunal for the revision of decisions made by the Patent Office. Composed of men trained to this peculiar duty, the new court would do away with the uncertainties in the construction and administration of rules of practice which have been inevitable in consequence of periodical changes of the Commissioner.

The proposed Court of Patent Appeals would be interposed also between the

courts of original jurisdiction, the Circuit Courts and the Supreme Court. Of course litigants retain the right to appeal finally to the Supreme Court, but the latter will deal only with questions of law and not with questions of fact. These must and can be argued at length, and to much better advantage to all parties concerned before the proposed tribunal.

Mr. Curtis has submitted the details of the bill to the justices of the Supreme Court. He has received from them suggestions which have been adopted and has secured their approval of the measure, which has been reported by the Judiciary Committee of the House. The manufacturing industries of the country can only look with approval and give their support to a proposal which holds out the promise of making less intolerable the law's delays.

Our Trade With American Countries.

The Bureau of Statistics, at Washington, has just published particulars of our import and export trade with all American countries during the fiscal year ended June 30 last. On comparing them with those of the previous fiscal year and arranging them accordingly, in tabular form, we arrive at some interesting and important facts. One important point should be taken into consideration, however: Shippers of goods by rail to Mexico and to the Dominion are not under any obligations to declare the quantity and value of their exports. The result is that the official returns are far below the actual amounts, as comparisons of American and Canadian figures and American and Mexican returns regularly show. Besides this, the smuggling trade is said to be of some magnitude.

U. S. Trade with Canada, Mexico, the West Indies, Central and South America.

	Imports— Thousands of dollars.		Domestic Exp't. Thousands of dollars.	
	1888.	1887.	1888.	1887.
Argentine Republic.....	5,902	4,100	8,099	5,871
Brazil.....	53,710	52,953	7,064	8,072
Chili.....	2,895	2,893	2,423	2,063
Costa Rica.....	1,609	1,410	1,065	704
Cuba.....	49,419	49,515	9,724	10,139
Porto Rico.....	4,412	4,862	1,920	1,707
Ecuador.....	1,119	1,131	811	1,049
Guatemala.....	2,085	2,649	888	553
Honduras.....	959	858	673	426
Hayti.....	2,919	1,753	4,323	3,059
Mexico.....	17,380	14,720	9,242	7,287
Nicaragua.....	1,496	1,632	861	701
Colombia.....	4,368	3,951	4,323	5,974
Peru.....	809	462	865	718
Salvador.....	1,473	1,059	645	477
Santo Domingo.....	1,459	1,380	793	1,014
Uruguay.....	2,712	2,819	1,337	1,394
Venezuela.....	10,061	8,261	3,008	2,827
French Possessions.....	129	408	1,715	1,384
Danish Possessions.....	399	501	808	605
British Possessions.....	58,641	52,629	42,856	41,738
Dutch Possessions.....	820	739	845	772
Totals.....	224,141	210,485	108,683	98,259

The import has increased from \$210,485,000 to \$224,141,000, a difference of \$13,656,000, or about 7 per cent., chiefly due to the advance in coffee and sugar, as hides have only improved since June. The domestic export rose from \$98,259,000 to \$103,683,000, a gain of \$5,424,000, or 5 per cent. In other words, the greater absorption of American goods has nearly kept pace with the appreciation in the value of products we receive from the rest of America, which is highly satisfactory, and augurs well for our domestic export during the current fiscal year in our busi-

ness intercourse with those countries. This is all the more likely because coffee, sugar and hides have continued to bring good prices in the United States and Europe, causing general prosperity in the producing countries. Returning wealth to impoverished planters and stock raisers makes a great difference in our dealings with the commission merchants and shopkeepers in Spanish America and Brazil. Steamship lines in that direction have also been multiplying; soon there will be one under the Argentine flag.

We have, for the sake of further elucidation of the subject, prepared another table, showing the trade which the rest of America did with foreign countries in 1886. We append to it one exhibiting their population, which in the aggregate is only less than ours by a couple of millions.

Trade of Canada, Mexico, the West Indies, Central and South America in 1886 with Foreign Countries:

	Popula- tion.	Imports. Thousands of dollars.	Exports. Thousands of dollars.
Argentine Republic.....	3,435,286	95,408	69,835
Brazil.....	12,932,375	106,651	105,279
Bolivia.....	1,952,079	872	1,228
Chili.....	2,536,969	48,233	52,683
Costa Rica.....	182,073	2,882	2,639
Cuba.....	2,306,393	46,170	64,840
Porto Rico.....	800,000	11,745	14,049
Ecuador.....	1,204,651	4,162	4,773
Guatemala.....	1,357,900	2,638	5,591
Honduras.....	458,000	1,245	1,325
Hayti.....	800,000	4,121	6,271
Mexico.....	10,447,974	31,600	34,483
Nicaragua.....	400,000	1,462	1,945
Colombia.....	3,000,000	14,000	5,000
Peru.....	3,000,000	9,184	6,616
Paraguay.....	1,337,436	1,216	1,178
Salvador.....	651,130	2,428	4,755
San Domingo.....	504,000	2,104	5,544
Uruguay.....	596,463	20,316	23,944
Venezuela.....	2,198,320	9,433	16,461
French Possessions.....	383,132	13,000	20,000
Danish Possessions.....	33,763	1,219	500
British Possessions.....	6,215,005	155,255	134,255
Dutch Possessions.....	113,300	2,800	2,700
Totals.....	56,836,252	588,192	588,847

The import was \$588,192,000 and the export \$588,847,000, nearly alike, but since that year the rise in products must have caused a greater volume, probably in about the same ratio as the expansion of our commerce with them. On comparing our total American trade in the fiscal year, 1887, with their total trade in the calendar, 1886, we find that the former was \$308,744,000, and the latter \$1,177,039,000. In other words, the latter was nearly four times the former. Our share in the American trade certainly should be larger, extensive though it may be, and we trust that a gradual favorable change will take place in this respect, situated as we are, and receiving such an enormous amount of colonial and other produce. Leaving this desideratum to be worked out by our activity and geographical position, as well as the excellence of our goods, it is gratifying to note that since the Centennial we have made considerable headway in exporting our merchandise to the countries named, that consequently what has been accomplished fully justifies the very best expectations for the future.

A matter to which attention was directed in a marked degree during the recent Scranton Meeting of the American Society of Mechanical Engineers was the utilization of coal dust as fuel. The accumulations throughout the coal regions have frequently been suggestive of very acceptable profits in places where efficient

means could be provided for burning the dust, especially under steam boilers, and attempts have not been lacking to develop a system of furnace practice which would meet the requirements. It is of some interest, however, to observe that no uniformity has been established in the accepted methods, and while one way of firing, say with large grates and slow rate of combustion, may have been found to give satisfaction in one place, exactly the reverse may be true in another. But the principal points appear to be the use of a shaking grate and the maintenance of a thin fire, so that cleaning can be readily effected. It is by these means that culm is being used so satisfactorily for steam raising at the works of the Lackawanna Iron and Coal Company, at Scranton, though it is but fair to state that the dust there is mixed with pea and buckwheat coal, for which the company can find no ready market. Forced draft on the closed ash-pit system is employed, and the boiler plant seems to give entire satisfaction. The question of comparative economies cannot, however, be at all considered in this particular case, since to burn the dust is there the most inexpensive way of getting rid of it. Something like 5000 tons of the mixture are consumed per month, the cost of the power being practically nothing except that of attendance. The conditions for a like record are, of course, not obtainable in all cases, but there certainly are many establishments where the dust, though possibly low in calorific value, might be burned to advantage, and under nearly equally favorable circumstances. We do not ignore the fact that, weight for weight, the culm may be so poor in quality, as compared with much higher priced coal, as to make its utilization not worth considering—in fact, unprofitable at any great distance from the base of supply, a much larger quantity of it being necessary to accomplish a certain result than of coal. It has not, however, been proven by any means that the dust, as a rule, is so poor a heating agent. It is eminently desirable that some good use should be found for it, and, while in the line of fuel briquettes and other forms of so-called artificial fuels it has not found an extensive field of application, it does not seem too much to expect its much wider and successful use as a fuel directly, especially in steam boiler furnaces.

Speculative Railroad Directors.

No single cause has contributed more largely to check the feeling of buoyancy in the business world than the happenings in the management of a few large railroads during the past few months. Complaints of the doings of speculative boards of directors are not new. Yet, the public receives a violent shock every time when insiders are forced ultimately to give an account of their stewardship, and it becomes impossible to conceal that the finances of great corporations have been allowed to drift into a frightful condition. It is true that, in the majority of cases, suspicion rests on roads whose managers are prominent in operations in Wall street, who are liberal with "points" and are eager to parade in the newspapers and on the tape their strong convictions of coming prosperity. The country has witnessed the spectacle of men, high in stand-

ing in financial circles, putting themselves on record in the most unqualified way, when they must have known that they were deliberately deceiving the public and their friends. Striking instances of this kind have happened in the past six months. They have done much to unsettle confidence at a time when the outlook seemed to warrant a bright future. Sharp practice like this cannot be too vigorously condemned. It is only too often accompanied by the cooking of reports of earnings and financial statements, and those who profit by stock operations during the period of concealment are only too apt to aid the demoralization following the final revelation of the truth for selfish purposes.

Another class of directors are those who autocratically handle the property committed to their charge with the best of motives. Long years of successful management may have bred a confidence and a pride which shrinks from acknowledging an error of judgment. Straining well-earned confidence and credit to the utmost to cover defeat or to tide over embarrassment, they are apt to surprise their friends and their enemies alike by startling developments. The difficulties into which one prominent system has been plunged lately will illustrate the dangers to investors and to the business interests of the country of such management. We attribute to such happenings as these the halt noticed for some time past in the rising tide of general prosperity. They are incidents which may delay but cannot in the long run arrest the movement. In nearly all the departments of the iron trade there is a hopeful feeling which augurs well for the future in spite of the setbacks which some of the developments in railroad circles have created.

English Competition in an Unexpected Quarter.

Under the provisions of the existing tariff, foreign competition in our domestic markets has been practically eliminated in many branches of the iron and steel trades. Tin plates, it is true, are wholly monopolized by foreign manufacturers, and cotton ties and wire rods are also largely in their hands, together with spiegeleisen and ferromanganese. We also purchase abroad considerable quantities of pig iron and steel rails whenever the consumption of these articles is so heavy that prices rise above the importing point. But in a very long list of iron and steel manufactures foreign competition has so completely disappeared that no apprehension is usually entertained of opposing bids being received from that source on domestic contracts. And, among them all, no interests have felt more secure in the impregnability of their position than the iron founders producing castings for every conceivable purpose. It is, therefore, with something of a shock to their serenity that they heard last week of the probability of a contract for 5000 tons of castings for a cable street railway in Denver being taken by English foundrymen. It is all the more aggravating to our domestic foundrymen, too, from the fact that these castings are not to be used on the seaboard, or only a short distance in the interior, but in the very heart of the continent, at a point so

remote from seaports that the inland freight rate is in itself a serious burden on the foreign manufacturer.

The contract in question was one of sufficient magnitude to invite bids from a large number of domestic foundrymen. Among the competing establishments were foundries in Chicago, St. Louis, Cincinnati, Kansas City, Omaha, Belleville, Ill., and Birmingham, Ala. No less than four Chicago concerns were represented among the bidders. The Chicago people confidently expected the contract to be secured by one of their number. They made very close bids, being anxious to have this work for the coming winter, when they would have little to do in their own specialty of architectural ironwork. A very low rate of freight from Chicago to Denver was also negotiated, the railroad companies being willing to do what they could to secure the work for Chicago and the freight for their lines. The lowest figure from American bidders is understood to have been made by the Chicago foundries and was under \$39 per ton of 2000 pounds, delivered in Denver, with a \$9 rate of freight between the two points. This was based on a cost of about \$16 per ton for pig iron at Chicago. Even Birmingham, Ala., with its very cheap pig iron, was unable to get under this Chicago bid. Yet English foundrymen, despite the duty, underbid the lowest American bidders about 90 cents per ton, through a broker in Kansas City. It is stated that they expect to ship the castings from Liverpool to Denver, via Galveston, for about \$7 per ton, or \$2 less than the rate from Chicago to Denver. The ratification of the contract is now awaiting the settlement of this freight rate.

An interesting question arises as to the rate of duty which will be paid on these castings. They consist mainly of yokes, so shaped as to support the track rails on their extended arms, the slot rails on central uprights, and the cable tube in an oval base. If they are wholly of cast iron it is difficult to see how they can pass the custom house at any other rate of duty than 1½ cents per pound under paragraph 157 of the Indexed Tariff. As it is asserted, however, that they will be imported at 45 per cent ad valorem, it is probable that they will be changed slightly from the condition of mere castings, so that they can be brought in as manufactures of iron under paragraph 216. If the duty of 1½ cents per pound should be imposed, it is evident upon very superficial computation that it would be impossible to import them at the price at which they are to be delivered. These facts will develop in time, as the occurrence is so important that it will not be allowed to pass wholly out of sight by the foundrymen interested.

Of vastly more importance than this one contract is the certainty of future foreign competition in a hitherto unaffected branch of trade, if it is carried through with satisfactory results to the English foundrymen and the Denver Railway. There is room for trouble in the adjustment of the proper tariff rates, in making sufficiently prompt deliveries, in supplying acceptable castings, and in figuring up a profit after the contract has been fulfilled to the letter. Should all these problems be solved in their favor, the groundwork will then have been laid for a large business in America by English foundrymen. They

would not touch a great deal of special work, and ordinary jobbing would not invite their competition, but carwork and bridgework and any other classes of castings made from standard patterns, and for which contracts are often given out in large quantities, would be open to them. With their very cheap pig iron and their very cheap labor and low Transatlantic freights, a 45 per cent. duty can be overcome in reaching this market. If, however, the duty of 1½ cents per pound, which appears to be the true rate on castings, should be imposed by the customs officers, our foundrymen will have no reason to fear outside competition, and can continue to pay their molders good wages on the American scale.

New Routes to Mexico.

The opening for through traffic from the United States boundary to the city of Mexico by the Mexican National Railroad Company is an event of more than ordinary importance in several respects, especially in bringing the two countries into closer commercial relations. The Mexican National has been in progress since the time of the opening of the Mexican Central, some four years ago, but the work was seriously retarded by the financial embarrassments of the Mexican Government, and was not pushed with vigor until English capital was enlisted and a new organization effected, so that within less than a year 352 miles of road have been built, connecting the sections which had been operated practically as independent lines. There are now in fact three separate routes from the United States to the Mexican capital, including the Mexican International, whose northern terminus is at Eagle Pass, from whence the track extends 384 miles to its intersection with the Mexican Central at Torreon. The three border cities, El Paso, Eagle Pass and Laredo, from henceforth will aspire to lead as centers for traffic with "our nearest neighbor."

The completion of the Mexican National is an event that more directly concerns points like St. Louis and Kansas City in the West and Galveston and New Orleans on the Gulf, which must ultimately derive important advantages from the inviting fields of enterprise which are now brought near to their doors. St. Louis, for example, now finds herself about 1900 miles from the Mexican capital and Kansas City about 1800 miles. This is a gain from 600 to 800 miles compared with the El Paso route. Taking into consideration the improved financial condition of the Mexican Government, which enables it to meet its obligations with promptitude, since the resumption of subsidy payments to the railroad companies two years ago, also the stimulus derived from new capital and the introduction of modern means of transportation in lieu of mule-packs, it is not unreasonable to expect a growth of traffic in that direction far beyond anything in former experience. To what extent the United States may be able to share in the trade of Mexico in competition with Europe, whose steamship lines concentrate at Vera Cruz, becomes an interesting question. Much depends probably on the consummation of the proposed reciprocal treaty.

It is not without interest to note that the Wheelock valves on the oscillating engines of the new Sound steamer Connecticut are 9 feet long.

CORRESPONDENCE.

Train Service and Accidents.

To the Editor.—The recent railroad disasters in Pennsylvania have, according to the testimony before the coroner's juries, demonstrated that carelessness borne of familiarity may bring to nought the intention of any system of rules arranged to protect the property of the railway company or the lives of its passengers. The lessons which these accidents teach offer a timely opportunity for some suggestions as to similar disasters which are daily invited by failure to carry out what are considered as the minor details of regulations adopted for the safety of travel. The business man, who spends a large portion of his time on railroad travel, and who is at all observant, can, on almost any trip, note some failures to carry out to the letter important regulations, and a few such may be mentioned.

It will probably be a surprise to most of those who travel between New York and Philadelphia to learn that heavy passenger trains of eight and nine cars are constantly run from one city to the other, on which the conductor has but one brakeman to assist him, in spite of the existence of a law of the State of New Jersey. When the conductor is taking up tickets from the rear cars, the brakeman is front; and, in case of the train coming to a stop, he must either jump from it before its movement entirely ceases, or waste what may be precious moments in reaching the rear of the train. If the brakeman goes back when the train stops, his reliance upon the system of signals encourages him to move with deliberation and even return before the signal is given from the engine. An instance of this occurred within ten days. Travelers in sleeping cars are familiar with the attractions they offer to trainmen, and instances may be mentioned where, on Western and Southern railroads, noted for long hours of continuous duty, the brakeman, whose place was at the rear of the train, was found asleep in the sleeping-car.

A gentleman, traveling on a branch of one of our prominent Eastern railroads during the present month reports that, at a grade crossing of another railroad, the conductor sat in the car reading a paper, while the brakeman attended to discharging passengers, came in to report that the connecting train was 9 minutes late and had 3 passengers. To this the conductor responded, "Pull ahead a little," and continued his newspaper perusal, while the brakeman signaled the train forward, then had it back to the station, when the connecting train arrived, received its passengers, and started the train on its journey. The conductor never left his seat until he went to collect tickets, and yet this was a branch of a railroad whose reputation for strict discipline is unequaled in the country.

The question which these instances suggest is: Are not the heads of departments contributory to this neglect by their failure to acquaint themselves with the method pursued by subordinates? The official's duty keeps him from devoting much time to travel, and, when he uses the road, it is generally in a special car or train, or, at all events, seldom in the cars which are patronized by the bulk of those who use the road, and these details of discipline escape his notice. If the officials upon whom the conductors, brakemen, engineers, switchmen and other employees depend for their positions could acquaint themselves more intimately with the manner in which the regulations are carried out there would be fewer opportunities for serious accidents, and the statement that our railroads are "run by

Providence, with a little help from the superintendents," would be further from the truth than it is now. J. B.

Tariffs of Transcontinental Lines.

The Interstate Commerce Commission, by Walker, Commissioner, has made public the result of its examination of the new transcontinental tariffs which were put in effect September 1, 1888. After stating the point of the former decision in the Denver case, that rates from San Francisco to Denver higher than the rates from San Francisco to Kansas City are not permissible under the short-haul clause of the act to regulate commerce, and showing that the new tariffs are clearly made in pursuance of an honest effort to conform to the provisions of the act as interpreted by the commission, the opinion proceeds to examine the details of the new system, which were not known to the commission until after they were put in force. The difficulties which arose at Chicago, St. Louis and other interior points from which rates were established to the Pacific Coast higher than the rates from New York City, are explained to have arisen from a series of commodity tariff which named articles on which low rates were made from specified points, leaving all other articles and points subject to the class rates under the Western classification.

In respect to these special tariffs the commission rules as follows: Rates that are just and reasonable from selected manufacturing points, through the entire territory east of the Missouri River and west of the Atlantic seaboard are *prima facie* just and reasonable from all other points in the same territory. A tariff naming a rate from one locality lower than that enjoyed by its neighbor, when circumstances are the same, tenders a preference or advantage to the first; and, when any shipper is damaged by the exaction of any additional burden, the preference becomes undue and unreasonable, unless it can be justified upon some sound and substantial ground. Common carriers are under obligations to take all descriptions of ordinary traffic from all points, and it is right that the rates should be known and announced publicly in advance of the offering of traffic. Under the act to regulate commerce shippers are not to be put in a position of subservience to common carriers, nor required to ask for rates, but are entitled to equal and open rates at all times. Discriminations are made and undue advantages are given by the special tariffs in question in giving different rates to places named and those not named, to manufactured articles named and those not named, to jobbers at places named and those not named, to manufacturers and to jobbers and other dealers. The opinion further states that these conclusions were made known on October 16 to representatives of the transcontinental lines at an interview arranged for that purpose, and were at once acceded to, the modified arrangements suggested by the commission as to west-bound business having gone into effect on October 23.

N. J. Mitchell, interested with M. V. Smith, metallurgical engineer, of Pittsburgh, is at the head of a movement to organize a scientific iron, steel and engineering society, to consist of young men between the ages of 18 and 25 years. This society is for the mutual instruction on everything pertaining to the above subjects, including mining and working of metals, civil and mechanical engineering, as well as the application of electricity. Young men of the above ages interested in such a movement will please address N. J. Mitchell, Hamilton Building, Pittsburgh.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., October 30, 1888.

After years of effort by the War Department the question of the country's defenses has at length taken tangible form in the appointment by the President of the Board of Ordnance and Fortifications provided for by the Fortification Appropriation act. The board, as already announced in general orders of the Adjutant-General's office of the War Department, consists of Major-Gen. John M. Schofield, General Commanding the Army, Col. Henry L. Abbott, Corps of Engineers; Col. Henry W. Closon, Fourth Artillery, and Lieut.-Col. Alford Mordecai and Capt. C. Morrison, Ordnance Department.

The act of Organization and Appropriation provides that the Board shall prepare suitable regulations for the inspection of guns and material at all stages of manufacture to the extent necessary to protect fully the interest of the United States. The order appointing the board provides that expenditures shall not be made or contracts entered into involving the Government in an aggregate expenditure exceeding \$6,500,000, nor an expenditure on the part of the Government in any one fiscal year in excess of \$2,000,000, and all guns and materials purchased under authority of this order shall be of American production and furnished by citizens of the United States.

The board has held a meeting for organization and expects to proceed at once in the prosecution of the objects for which it was created. It will begin operations by a careful review of the most advanced systems of defenses and plans of fortification in practical use by the great warlike nations of the globe, for the purpose of utilizing in a scheme of seacoast and frontier defense all the best features of known systems, with such improvements as the abilities, experience and skill of our own officers may suggest. The board will also take up the subject of defensive armaments for land defenses, high power ordnance, improved projectiles and warlike explosives.

The labors of the board in the end will involve large orders of iron and steel in the various forms required by modern defenses and guns. A member of the board, speaking on this subject, said: "It is well established that stone defensive works are practically useless. It is also conceded that earth works easily repaired are of merely temporary, uncertain and very doubtful means of defense against the destructive explosives discovered and devised by modern research and chemical skill. Therefore, the only recourse will be the designing and adaptation of steel armor for land defenses the same as for ships, the construction of floating batteries which can be moved about harbors or be operated along the seacoast and various other defensive contrivances." The officer remarked, further, "Now, all this will create an immense demand for iron and steel, which should be of enormous advantage to the iron industry of the country." It is expected that the board will be able to submit a preliminary report by the time of the meeting of Congress, although no further legislation nor voting of money will be required until the present \$6,500,000 available shall have been expended.

Tobin Bronze.—The Ansonia Brass and Copper Company, of 19 and 21 Cliff street, New York, have brought out a new bronze, the Tobin bronze, which they sell in the form of sheets and plates, rods, wire, seamless tubes and ingots. The latter are of three qualities, which are suitable for a large variety of purposes. A test made by Pro-

fessor Thurston shows a tensile strength of 67,600 pounds per square inch of original section. A series of tests made of hot rolled Tobin bronze by a board of naval officers gave a tensile strength varying between 58,734 and 59,905 pounds, and 5.5 to 5.625 per cent. elongation, cross-wise, and between 54,704 pounds and 62,389 pounds tensile strength and 4.5 and 7.875 per cent. elongation in the direction of its length.

OBITUARY.

HENRY W. OLIVER, SR.

Mr. Henry W. Oliver, Sr., one of the oldest residents of Pittsburgh, died at his home in Hazelwood, a suburb of that city, on Thursday, the 25th inst., in the eighty-second year of his age. The active cause of his death was pneumonia. Mr. Oliver was born in the year 1807, at Tattykeel, parish of Killdress, County Tyrone, Ireland. He married Margaret, daughter of David Brown, Esq., of Donoughmore, and settled in the town of Dunganon, where he became an influential citizen. Political opinions caused him emigrate to America, and he settled in Pittsburgh, 1842. He was engaged in the saddlery and harness business on Wood street until 1865, when he retired from active life. He represented the Twenty-third Ward in Council two terms, and was appointed by the Judges of the Courts of Common Pleas as a member of the Board of Viewers in 1877, to which position he was reappointed for 11 successive terms. His wife, with his four sons, David, Henry, James and George, the well-known iron manufacturers of Pittsburgh, and two daughters survive him.

PHILIP R. GEORGE.

Philip R. George, for over 40 years the manager of the mining interests of Cooper, Hewitt & Co., died suddenly of disease of the heart last Sunday evening, at Ringwood, N. J., where he has resided for the last 35 years. Originally a Cornish miner, by force of his ability, strict integrity and great energy he rose to the important position of manager of the most extensive and important mines in New Jersey. Mr. George was 68 years old.

Efficiency of Steam at High Pressures.

In an interesting paper on "The Efficiency of Steam at High Pressures," presented by Mr. W. W. Beaumont, at the recent meeting of the British Association for the Advancement of Science, it was attempted to show that the Carnot theorem as expressed by the equation

$$E = \frac{T - t}{T}$$

is inapplicable for the calculation of the efficiency of steam as used in a steam-engine cylinder. It is shown that the work done by expanding steam bears no relation to the fall in temperature due to fall in pressure, and that the dynamic and thermodynamic values of steam working expansively do not approach each other until an absolute pressure of over 200 pounds per square inch is reached. The relative dynamic values calculated by isodynamic or by any of the forms of the adiabatic formulæ, are not even approximately equal; but, with steam at pressures between 350 pounds and 50 pounds per square inch the work done by expansion varies from 692 foot-pounds to 900 foot-pounds per degree of fall in temperature.

In falling from 350 pounds to 300 pounds, the expansion work of a pound of steam is taken as 10,372 foot-pounds, while the fall in temperature, 15°, represents (taking the specific heat of steam for purposes of illustration as 1) 11,380 foot-pounds. In falling from 100 pounds

to 50 pounds, the expansion work done is taken at 49,280 foot-pounds, while the fall in temperature being 46.8°, the mechanical equivalent is 36,130 foot-pounds. In the former case, then, there is a difference of 1008 foot-pounds between the dynamic and thermodynamic work, the latter being the greater, while in the second case there is a difference of 18,150 foot-pounds, the dynamic or expansion work being the greater. Thus, at the lower pressures, the fall in temperature is much too small to account for the work done by expansion, while at the high pressures the fall in temperature is more than sufficient. Condensation of steam to provide for this difference must therefore take the place in the lower pressure engine cylinders. The argument leads to the conclusion that pressures higher than those now used can be very advantageously employed. When the exchange of heat due to difference in latent heat, total heat, and temperature at the different pressures is taken into account, the difference in favor of the high-pressure steam becomes much greater. An explanation is afforded of the great efficiency of triple stage expansion engines as compared with the lower pressure simple engines, and of the greater efficiency of the steam jacket on low-pressure engines than on high-pressure engines. It is clear that the steam in the steam engine must be considered with reference to the heat used, and not to the fall in temperature.

The McClure Coke Company, of Pittsburgh, have posted the following notice on their coke plants in the Connellsville region: "On and after November 1, 1888, until further notice, the following wages will be paid at the works of the McClure Coke Company: Mining and loading room coal, per 100 bushels, 85 cents; cagers, per run, \$1.78; drivers, shaft and slope mines, per run, \$1.78; drivers, drift mines, \$1.70; track-layers, shaft and slope mines, per day, \$1.78; track-layers, drift mines, per day, \$1.70; trappers, per day, 64 cents; inside laborers, per day, \$1.57; coke-drawers, per 100 bushels charged, 51 cents; levelers, per oven, 9 cents; car forkers, per car less than 40,000 pounds capacity, 90 cents; 40,000 pounds capacity and over, \$1.05; yard laborers, per day, \$1.27." The foregoing is an increase of 6½ per cent. over the present scale of wages. The J. M. Schoonmaker Coke Company, of Pittsburgh, have also posted a similar notice on their various works.

An Artificial Colliery.—One of the novel features of the Paris Exposition is to be an artificial colliery. During the descent into the mine the visitor is to be made the subject of an illusion. The sides of the artificial shaft will be formed of canvas painted to show the stratification in a typical deep pit. The cage begins to descend with a considerable velocity, but is brought gradually to rest within a few yards of the pit bank. As the motion of the cage is retarded, the canvas sides of the shaft are drawn up with increasing velocity, the acceleration being proportional to the retardation of the cage. The effect upon the spectator standing upon the deck of the cage is one of continued descent at the same speed at which he started, and the illusion is kept up after the cage comes to rest by a movement of trepidation communicated to the latter. The illusion is said to be perfect. When a great depth has apparently been reached, the canvas is brought to rest gradually, the trepidation of the cage being made to cease at the same instant. The visitor, who believes himself to be deep in the bowels of the earth, then steps out of the cage and enters the workings, where he may see the various operations of coal-getting.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St. }
PHILADELPHIA, Pa., October 30, 1888.

The past week has been fairly satisfactory on the whole, although there is not that buoyancy which characterized the market earlier in the month. Still, prices are steady, and for the present everything goes directly into consumption, so that there is no accumulation of stocks, nor any scarcity of business at about current quotations. Considering that this is the last week of the month, and the week preceding the election, the comparative dullness ought not to cause surprise, although it may give rise to a little uneasiness until the matter is settled. But the general feeling is hopeful, and it is believed that the outlook is such as to warrant at least a continuance of a volume of business such as we have had during the past two or three months.

Pig Iron.—A very considerable business has been done during the week, and in most cases at full quoted rates. There is also a good deal of inquiry for quotations on large lots, although it is hardly likely that they will be closed until after the election; then it will depend upon circumstances. As regards what may be the outcome, there is absolutely no basis upon which to form an opinion until the election is over. Sales during October appear to have been very much larger than the output, probably nearly double the amount, so that the coming month's business will be of unusual importance in determining the exact position. As matters now stand the balance of the year's output is practically all sold. Prices therefore, need not suffer under a very light business during the next few weeks, but the attitude of buyers will soon determine that point. If they decide to place orders during the early part of November, a very firm, if not a higher, market may be regarded as certain, while hesitation or procrastination will be just as likely to have the opposite effect. For the present, sellers show great firmness. Quotations are closely maintained and no inducements offered to effect sales beyond what are usual, as in the case of large buyers or to regular customers. As a matter of fact, sellers are about as much afraid of an advance as buyers are of a decline, which in some measure accounts for the uniform firmness with which prices are maintained. Sales during the past week have been made chiefly at \$16.50, \$17.50 and \$18.50 @ \$19, at tide, for the three grades, but some good brands have been made available at \$16, \$17 and \$18, while others of a specially desirable character have brought \$17, \$18 and \$19.50, according to circumstances. The feeling is decidedly firm, and at the moment concessions are not taken into serious consideration.

Blooms.—There is no change in prices, which are about as follows: Nail Slabs, \$29 @ \$29.50, at mill; Billets from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 @ "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$30 @ \$31 for Nail Slabs; \$34 @ \$36 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There is still something of a scarcity, and sellers are asking from \$30 to \$30.50, delivered, for good Bars. Buyers are holding back, however, and, while one or two sales have been made at these figures, there are evidences of hesitation, if not of weakness, at the prices named.

Bar Iron.—The demand is not quite as active as it was earlier in the month, and prices seem to be a trifle easier. This is perhaps more in appearance than in fact; first, because the quotations recently given were more or less nominal, and, second, because the figures now realized are decidedly better than those obtained some time ago for a similar class of orders, which are now about completed. For instance, mills that were loaded up with business at 1.75¢ would make their quotations 1.85¢ @ 1.90¢ on such small lots as they could sell. Now that they are open for large orders they accept 1.8¢ @ 1.82½¢, which, as a matter of fact, is an advance, although at first sight it looks like a decline. Quite a large amount of business has been taken under these conditions, and in many cases mills are again filled up for some weeks to come. There are others, however, that are on the watch for new business, and there is little doubt that buyers can do better than seemed likely two or three weeks ago. Some, of course, hold their prices with absolute firmness, but there are others who are either differently situated or who take a different view of the market. Prices are therefore irregular, varying from 1.85¢ to 1.95¢, according to circumstances, with still lower figures in exceptional instances. Skelp Iron is unchanged, 1.95¢ to 2¢ asked, with sales at the inside quotation.

Plate and Tank Iron.—A good deal of activity is reported in small lots, but large orders are still "in the near future." Mills are very busy, nevertheless, and the chances are favorable for their remaining so to the end of the year. It is understood that large orders from the shipyards will be placed during the early portion of the month, which will be sufficient to place the mills in a very independent position for some time to come. Meanwhile the constant demand from the smaller class of trade aggregates a nice amount from week to week and keeps prices steady and firm as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—The feeling is a trifle easy in this department. Old work is being rapidly finished, but is not replaced as fully as could be desired with new orders. There is the usual talk of new things to come, but for the present the outlook is uncertain and not as encouraging as was expected some time ago. Prices are about as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.8¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—There is a very good demand, and stocks are so light that mills are kept fully employed in meeting the demand for small lots to assort up with. Prices are firm at about the following quotations:

Best Refined, Nos. 26, 27 and 28.... 3¼ @ 3¼¢
Best Refined, Nos. 18 to 25..... 3 @ 3¼¢
Common, ¼¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28.... 4¼ @ 4¼¢
Best Bloom Sheets, Nos. 22 to 25.... 4 @ 4¼¢
Best Bloom Sheets, Nos. 16 to 21.... 3¼ @ 3¼¢
Blue Annealed..... 2.8 @ 3 ¢
Best Bloom, Galvanized, discount..... 62½ %
Common, discount..... 67½ %

Steel Rails.—The feeling is somewhat unsettled, and buyers and sellers appear to be a good way apart in their views. Manufacturers find the cost of production steadily hardening, and they begin to think that they ought to have prices to compensate, hence they are not inclined to meet the views of those who are talking lower figures. Ores are scarce and dear, and as the prospects of a decline are somewhat remote makers of Rails are not offering anything below \$29, and intimate that they must have that or more, or close

their mills. So far as this market is concerned the feeling is undoubtedly firm, based more on the high cost, however, than on any immediate prospect of an increasing demand.

Old Rails.—Nothing doing in this market, but the general position is the same as for weeks past. Lots in store are held at \$24 and upward, while buyers seem to get what they require from other points at prices ranging from \$24 to \$25, delivered at mills. Bids of \$23 @ \$23.50 can be had for T's on cars or to arrive, with sellers as above noted.

Scrap Iron.—There is plenty of demand at the prices quoted last week, which are again repeated, as follows: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$18 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Merchant Steel.—The demand is well maintained at prices as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Wrought-Iron Pipe.—There is still a very active demand, and mills have all the orders they can handle for some time to come. Prices are steady, with discounts as follows: Black Butt-Welded, 52½ %; Galvanized do., 42½ %; Black Lap-Welded, 62½ %; Galvanized do., 52½ %; Boiler Tubes, 60 %.

Nails.—There is no change of any importance, although there is a growing impression that prices are pretty well down to their lowest. Quite a number of mills are shut down, and are likely to remain so unless there is some very marked change in the position. In a general way \$2 is quoted from store, but there is no uniformity, so that \$1.90 @ \$2 is probably about the range, although at some points Nails are quoted at lower prices than these.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, October 29, 1888.

A decidedly quieter condition of trade is noticed in nearly every branch, and for the first time the influence of the approaching election is felt in a diminished volume of sales and a general disinclination to enter upon new contracts. An exception is noted in such commodities as are always in greatest demand at this season, and which are therefore bought or sold without regard to extraneous influences. Such changes in prices as have come to light during the past week have been almost uniformly downward, but not sufficiently so to excite apprehension of a general break. The dullness of trade has caused occasional concessions from individual manufacturers apparently in need of orders, but the ordinary buyer will find very little change in the quotations made to him.

Pig Iron.—Few entries were recorded in the sales-books of the local dealers during the past week, and if there were any large lots among them, the fact has been carefully concealed. The members of the trade and the Chicago foundrymen, generally, are considerably agitated over a report that the 5000-ton contract for castings for a cable road in Denver, which had been confidently expected to be placed here, has been captured by English manufacturers. The contract is a very important one at this particular juncture, as the Chicago Architectural Works are short of orders, and it would have helped them

nicely in getting through the winter. An uncomfortable feeling prevails, also, in regard to other contracts for castings in which foreign competition may develop. Inquiries are in the market for a considerable quantity of Lake Superior Charcoal Pig Iron, prices of which are reported to be very firmly held. Although an advance in Southern freights of 20¢ per ton is to take effect on the 1st prox., the price of Southern Coke Pig Iron is slightly easier, lower rates being necessary if business is to be taken from Northern furnacemen. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$20 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband), No. 1, 20.50 @ 21.50; other Ohio Soft Irons, No. 1, \$17 @ \$18; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$18; No. 3, \$16 @ \$17; Southern Coke, No. 1 Foundry, \$17.50; No. 2 Foundry and No. 1 Soft, \$17; No. 3 Foundry and No. 2 Soft, \$16.25; Gray Forge, \$15.75.

Bar Iron.—A few car orders are in the market, but there is no business of any magnitude in sight. The demand for small lots is brisk, but buyers usually ask for quicker deliveries than the mills can guarantee, which throws an unusual proportion of this class of trade into the hands of jobbers. About 1.75¢, half extras, f.o.b. Chicago, is the prevailing price for mill lots of Common Iron, with concessions obtainable only on very favorable specifications. Car orders are reported to have been placed at 1.75¢, flat, f.o.b. Chicago. Store prices still range from 1.90¢ to 2¢, according to quantity and quality.

Structural Iron.—Some small orders have been taken, but nothing heavy is to be expected so late in the season. Store prices are as follows: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢. Mill orders are taken at the following rates, f.o.b. Chicago: Angles, 2.20¢ @ 2.25¢; Universal Plates, 2.23¢; Tees, 2.55¢ @ 2.65¢; Beams and Channels, 3.40¢. On combination orders, in which Angles form a part, prices have recently been seriously cut.

Plates, Tubes, &c.—Great activity has characterized this branch of trade, in marked contrast with the condition of business in most other lines. Large orders have been taken for Tank Iron, while boiler-makers have bought very freely from store. The Tank Iron orders were placed at unexpectedly low figures, in view of the prices hitherto quoted by the mills. In every other respect the market has been very firm, and former quotations from store are continued, as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 ¢ off.

Sheet Iron.—Deliveries of Black Sheets are now proceeding in more satisfactory shape, showing that the mills are not so crowded as they were recently. They quote for forward delivery 3¢ @ 3.10¢, at mill, for No. 27, according to time specified. Jobbers are selling freely at 3.20¢ for No. 24, 3.30¢ for Nos. 25 and 26 and 3.40¢ for No. 27, with a concession to best buyers.

Galvanized Iron.—Manufacturers' agents report renewed briskness in the demand last week, keeping them as far as ever from replenishing their warehouse stocks. Prices show no indication of moving upward, but, on the contrary, small lots are now selling at 60 ¢ and 5 ¢

off for Juniata, and 60 ¢ and 10 ¢ off for Charcoal.

Merchant Steel.—Open-Hearth Spring Steel, which has hitherto been held by the association of manufacturers at 2.90¢, has been taken out of their list, and the members of the association are free to make their own prices on it. So far nothing has come up to test values and establish a new quotation. Business is fair in a general way, but no heavy transactions are reported. Association prices are as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Inquiries are increasing for next year's delivery, and some fair-sized lots are wanted for this fall and winter, but so far as can be learned only some small orders were actually placed here during the week. Construction companies are trying to purchase Rails with bonds, notes and all other kinds of paper, but the manufacturers insist upon the cash. New railroad schemes are abundant, and excite renewed hope of better business next year. The makers are still quoting \$30 for all deliveries.

Old Rails and Wheels.—No transactions are reported in Old Rails. Holders ask \$24, but buyers are well supplied for the present and are not inclined to add to their stock unless the price should recede to about \$22.50. Mahoning Valley mills are said to be able to purchase Rails from the East at \$24, delivered. For Old Car-Wheels \$20 is asked, but no sales have come to light.

Scrap.—Large sales of No. 1 Railroad Scrap have been made during the past week at prices ranging from \$20.50 to \$21, and Track Scrap at \$19.50. The dealers here, as a rule, are not soliciting sales. Lots of 300 to 500 tons have, however, been offered by them at \$20, delivered to Chicago mills. Outside dealers are offering large lots at the same price. Notwithstanding the efforts of some of the dealers to work prices up, the feeling is generally in favor of a lower range of values in sympathy with other Old Material and easier prices of Manufactured Iron. Steel Scrap is looking up slightly, owing to inquiries from Pittsburgh mills. Mixed Country Scrap is still quoted at \$15. Selling prices of carefully selected Scrap are as follows, per ton of 2000 lb: Horseshoes, \$20; Axles, \$26.50; No. 1 Mill, \$15.50 @ \$16.50; Pipes and Tank, \$12 @ \$13; Light Wrought, \$11; Cast Machinery, \$15; Stove Plate, \$12; Cast Borings, \$9.50; Wrought Turnings, \$12 @ \$12.50; Axle Turnings, \$14; Coil and Leaf Steel, \$17; Locomotive Tires, \$15.50.

Hardware.—The Shelf Hardware trade is as active as ever, but in heavier goods business has been falling off from day to day. This is particularly the case with the country trade, the city demand being, if anything, stronger than it has been. In consequence of the drop in Lead the price of Shot has fallen from \$1.40 to \$1.25, and Solder is now quoted at 15¢ for strictly half-and-half. In Nuts an advance has been made from 5.75 ¢ to 5.40 ¢ off, or 70¢ per keg, for Square. This is due to the reorganization of the combination. No changes worthy of note have occurred in any other line.

Nails.—The current of trade is moving very sluggishly, and reported concessions on factory prices of both Cut and Wire Nails seem to have had very little effect thus far in quickening it. Regular quotations from factory are still \$1.90 for Steel and \$2.55 for Wire, both f.o.b. Chicago. Small lots are jobbing at \$2.10 for Steel and \$2.60 for Wire, but some weakness is manifested in this direction also.

Barb Wire.—The near-by trade is confined to small lots, which are supplied by jobbers at 2.90¢ for Painted, and 3.60¢ @ 3.65¢ for Galvanized. Our advices from merchants in Kansas and other Western States are to the effect that manufacturers are quoting carload lots at 2.75¢ for Painted and 3.35¢ for Galvanized, f.o.b. Chicago.

Pig Lead.—A few hundred tons were sold at rates ranging from 3.80¢ to 4¢, closing at the lower figure. It is reported that no Lead is pressing for sale here, but that transactions have occurred in the customary channels of trade only, no evil effects having followed the Corwith failure.

The charcoal furnace at Appleton, Wis., whose product is sold by Pickands, Brown & Co., 115 Dearborn street, Chicago, was burned on the 28th, the plant being reported completely destroyed. The fire was caused by the Iron breaking through the stack. The furnace would probably have been blown out by the 1st of January for repairs.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. }
CINCINNATI, October 28, 1888. }

Pig Iron.—The local market for Pig Iron during the past week has been quiet. The only feature of interest has been the report of several sales of round lots of Iron made by a few Southern furnaces at prices a little under those now generally current. The belief is that these stacks had accumulated considerable Iron, which they were very desirous to sell, and the pressure resulted in lower prices. Otherwise prices are fairly well sustained. As a rule the market waits upon the Presidential election; buyers, although they anticipate higher prices, are still inclined to await certainties before contracting more largely ahead. The aggregate volume of business during the week has not been small, but individual sales have been light. There are no new features. General business is not active, and the money market is extremely easy. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @ \$17.00
Southern Coke, No. 2.....	15.75 @ 16.00
Southern Coke, No. 3.....	15.50 @ 15.75
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	17.50 @ 18.50
Hanging Rock Charcoal, No. 1....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2....	19.50 @ 22.00
Tennessee and Alabama Charcoal,	
No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal,	
No. 2.....	17.00 @ 18.00

Forge.

Strong Neutral Coke.....	14.75 @ 15.00
Mottled Neutral Coke.....	13.75 @ 14.00
Gray Forge.....	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 25.00
Hanging Rock, Cold Blast.....	22.00 @ 26.00
Lake Superior Car-Wheel and Malleable.....	20.50 @ 21.50

Nails.—There has been a fair movement during the week and the market has ruled steady. Jobbing prices are based upon 12d @ 40d, which sell at \$2.10 per keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 per keg.

Manufactured Iron.—No new features have been developed; there has been a fair trade and a firm tone has prevailed, without change in prices. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 8½¢ @ 4½¢ per lb.

Old Material.—There has continued to be only a moderate demand for Old Wheels, which are quotable at \$19 @ \$19.50, spot; Old Rails have ruled steady, with moderate sales at \$23, cash, here.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
Pittsburgh, October 30, 1888.

While there is scarcely anything heard or thought of just now but politics, there is continued activity in the general Iron and Steel trade. At the Vesuvius Iron Works, of Moorhead, Bro. & Co., the experiment of making gas from coal has been successfully made, and the cost for heating Iron is placed exactly at 60¢ per ton, which is very much cheaper than the present cost of natural gas. Brown, Bonnell & Co., Youngstown, Ohio, have abandoned natural gas and gone back to coal, owing to the scarcity and enhanced cost of the former. There is not much doubt that the manufacture of fuel gas from coal, and possibly from petroleum, will be a success sooner or later, and it is this apprehension, no doubt, that is unfavorably affecting natural gas stocks. When natural gas was first introduced the cost was less than that of coal, but it now costs fully as much and is not so reliable; at times the supply is short, so that for a time a mill may have to shut down. The cost of natural gas to private consumers has in many instances been more than doubled within a year, but not many of them are going back to coal. It is claimed that the price of natural gas was too low, but until the past year or so there were so many companies and so sharp was the competition that it was impossible to advance the rates; now that nearly all other companies have been absorbed up by the Philadelphia company, the price has been pushed up, and this has had very much to do with experimenting on manufactured gas to take the place of natural gas.

Pig Iron.—No particular changes to note in the situation. While the market is quiet, and possibly a little easier, there is no falling off in consumption, which never was much, if any, larger than it is at present. Production is also large, and being increased as additional furnaces are being started, but there is no accumulation of stock, and the market is in a good, healthy condition. As compared with prices of a week ago, there has been no change, with the exception of Bessemer, some sales of which have been made at a decline of 25¢ @ 50¢ per ton. We quote as follows:

Gray Forge Neutral.....	\$15.75 @ \$16.50,	cash.
All Ore Mill.....	16.75 @ 17.25,	"
White and Mottled.....	15.00 @ 15.50,	"
No. 1 Foundry.....	18.00 @ 18.50,	"
No. 2 Foundry.....	17.00 @ 17.50,	"
Charcoal Foundry.....	21.00 @ 24.00,	"
Charcoal Mill.....	19.00 @ 20.00,	"
Cold Blast Charcoal.....	25.00 @ 28.00,	"
Bessemer Iron.....	17.50 @ 18.00,	"

Standard brands of Neutral Mill selling at \$16 @ \$16.25, cash, and while furnace-men are refusing to sell Bessemer below \$18, cash, consumers have no trouble in getting all they want at \$17.50.

Ferro and Spiegel.—Sales of 80 % Ferromanganese, at \$56.50 @ \$57, cash, and 20 % Spiegel at \$28.50, cash.

Muck Bar.—There has been but little new business reported during the past week, but prices remain unchanged at \$28.50 @ \$29, cash. There does not appear to be as much inquiry as there was some time ago, but so far as we are advised there is no pressure to sell.

Manufactured Iron.—There is nothing new or important to note; while there is not so much new business, mills are nearly all sold ahead and have about all they can do, and this will no doubt be the situation until the close of the present year, when there is usually a lull for a week or two. Prices remain unchanged: Bars, 1.80¢ @ 1.85¢; Plates, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢, all 60 days, 2 % off for cash; Skelp Iron, 1.85¢ @ 1.90¢ for Grooved, and 2.10¢ @ 2.15¢ for Sheared.

Nails.—No change in prices here; full card rates are still being demanded and obtained; but it is said that Wheeling is again cutting 10¢ @ 15¢ per keg below. Wheeling cannot make Nails any cheaper than Pittsburgh, and Pittsburgh manufacturers aver that even at full card rates the margin for profit is small. We continue to quote upon a basis of \$1.90 for 12d to 40d, 60 days, 2 % off for cash.

Wrought-Iron Pipe.—Manufacturers report little or no change in the situation as compared with that of a week ago. Possibly there is not quite so much new business, for the mills are busy and are likely to continue so until well toward January. No change in prices. Discounts on Black Butt-Welded Pipe, 52½ ¢; on Galvanized do., 45 ¢; on Black Lap-Welded, 62½ ¢; On Galvanized do., 52½ ¢; Boiler Tubes, 60 ¢ off regular list; Two-inch Tubing, 13¢ per foot, net; 5½-inch Casing, 40¢ per foot, net.

Old Rails.—There have been sales of some 3000 tons reported at \$25, cash, including 2000 tons for delivery at Youngstown, Ohio, at price quoted. Some of the railroads have bought new Steel Rails and are putting in Old Iron Rails as part pay; so far as we can learn, there are no American Tees offering below \$25.

Steel Rails.—Some round-lot orders have been booked here within the past few days, but terms are strictly private. It is said, however, that sales were made for delivery during the next five or six months as low as \$28.50 and even \$28.25, cash, delivered on cars in Pittsburgh. It is reported here that the syndicate is not harmonious, and that an early dissolution of the same is not improbable.

Blooms, &c.—Bessemer Steel Blooms and Billets are still quoted at \$29 @ 29.50, cash, on cars at makers' works; Nail Slabs, \$28.75 @ \$29; Domestic Bloom and Crop Ends, \$19 @ \$19.50. Steel mills are pretty generally busy.

Merchant Steel.—There is a continued good degree of activity, but no recent change in prices. Best Brands of Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-Hearth Steel, 2½¢.

Railway Track Supplies.—Prices remain unchanged. Spikes, 2¢, 30 days, delivered; Splice Bars, 1.80¢ @ 1.85¢; Track Bolts, 2.85¢ with square and 2.95¢ with hexagon Nuts.

Old Material.—There is a fair demand, and prices are steady. No. 1 Wrought Scrap, \$21, net ton; Car Axles, \$26 @ \$27; Cast Scrap, \$16, gross; Cast Borings, \$12.50 @ \$13; Car Wheels, \$20.

One of the latest rumors is that Mr. John Walker, who recently withdrew from the firm of Carnegie, Phipps & Co., and James I. Bennett, for many years of the firm of Graff, Bennett & Co., are to form a partnership, and re-enter the Iron business. As yet the rumor lacks confirmation.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, October 29, 1888.

The past few days has demonstrated the inadequacy of the railroad lines to meet the wants of the shippers. Although the lines have added largely to their rolling stock during the year, they are still far behind the requirements of the country. A prominent railroad official is reported to have said that if 15,000 new cars, with the necessary motive-power, were divided up among the different lines they would all be absorbed at once in moving the freight that is being offered. The money market shows a continued stringency and high rates of discount still prevail. The cotton

crop is drawing heavily upon the resources of the banks, and another reason for the scarcity of money is the fact that of the many thousand manufacturing enterprises that have been started throughout the South, a large majority of them have absorbed their capital on the construction of buildings and purchasing machinery, leaving their sources for running expenses dependent upon their bills receivable, which are available only at the banks, or more frequently on the street; even their cash sales more frequently than otherwise run from 30 to 40 days before they are available. Bank rates are from 10 % to 12 %, and outside 12 % to 18 % per annum, on what is considered short-time No. 1 paper.

Pig Iron.—There are hardly any changes in the market worthy of mention. The same condition of affairs continues as reported during the past few weeks. Consumption and demand appear to be about equal with the output. The reinforcement to the supply by the blowing in of new stacks does not appear to be a factor worthy of notice, and the product of those that are still to come will probably be absorbed without causing even a ripple in the general market. It appears to be a matter of surprise to many producers where it all goes to and what is done with it; but, nevertheless, it all goes somewhere, and is utilized for some purpose or other and is all paid for. In reference to price there is no change either way to report. Most of the furnaces have contracted their output for the balance of the year, and many have reached ahead as far as July 1, 1889—mostly on a basis of present prices. At the present writing there are in the Birmingham district 14 stacks blowing and 6 idle; in the Chattanooga district 10 blowing and 2 idle. Most of those that are idle will go in blast within the coming month and four new ones that are nearly completed will probably blow in before the 1st of January next.

Cleveland.

CLEVELAND, October 29, 1888.

Iron Ore.—The total amount of Ore sent down by the different ranges to date is as follows: Marquette Range, 1,543,447 tons; Gogebic Range, 1,100,451 tons; Menominee Range, 926,190 tons; Vermillion Range, 368,385 tons; total shipments to date, 3,938,478 tons. Ore is still coming down at a rapid rate, and there seems little likelihood of any advance in lake freights. The Escanaba rate is now \$1.25 per ton, while the freight from Ashland and Two Harbors is but \$1.65. This rate is considered very reasonable by both dealers and purchasers and, sales would be much more numerous but for the fact that under the advancing market of a month ago buyers bought quite freely and are now fairly well supplied. This reason, together with the hope that quotations might possibly be lower, has led them to delay further purchases. Dealers are holding the few Ores still in the market at last week's prices. A few scattering sales are reported, but none sufficiently large to furnish material for a correct estimation of the business likely to follow closely upon the heels of the election. The following are the latest quotations, f.o.b. cars lower lake ports:

No. 1 Specular and Magnetic Ores, Bessemer quality.....	\$6.00 @ \$6.15
No. 1 Specular and Magnetic Ores, Non-Bessemer quality.....	5.25 @ 5.50
Red Hematite Ores, Bessemer quality.....	5.00 @ 5.25
Red Hematite Ores, Non-Bessemer quality.....	4.20 @ 4.4
Menominee Range Ores, Bessemer quality.....	5.25 @ 5.5
Menominee Range Ores, Non-Bessemer quality.....	4.00 @ 4.25
Gogebic Range Ores, Bessemer quality.....	5.25 @ 5.50

Pig Iron.—A light and yet a fair trade characterizes the local market. The de-

Siemens-Martin Steel, Charcoal finish, \$5 @ \$5.75; Coke finish, \$4.70; Ternes, \$4.20 @ \$4.35; Bessemer Cokes, \$4.45 @ \$4.50, and Wasters, \$4.25. Net import into this country during the first eight months, 454,445,062 lb, against 430,218,960 in 1887.

Lead.—Outside of the Metal Exchange, where, during the week, only 164 tons were sold, the sales amounted to about 1000 tons at 3½¢ @ 3¼¢, closing at 3.70¢ @ 3.80¢. Everything remains in confusion, pending a clearer insight into Corwith & Co.'s winding up settlements, and consumers do not feel disposed to do anything to speak of till after the elections. At St. Louis the price is 3½¢. In London Soft Spanish gave way from £13.15/ to £13.5/.

Spelter.—At the West Ore has improved from \$30 75 ton to \$31, and is scarce at that, while the output will decrease when the cold weather sets in. The demand here is moderate, and supplied at 5½¢ from second hands, but it cannot be sold without loss by smelters for less than 5½¢, at which Common Domestic is held, and Silesian at 6¢.

Antimony.—Hallett has continued selling moderately at 10½¢, and Cookson at 12½¢ @ 12¼¢.

New York Metal Exchange.

The following sales are reported:

THURSDAY, October 25. (Under the rule.)		
100 tons Lead, spot.....	3.82½¢	
64 tons Lead, October.....	3.85¢	
(Seller's right to double.)		
FRIDAY, October 26.		
16 tons Tin, November.....	3.80¢	
100 tons Lead, October.....	3.80¢	
SATURDAY, October 27.		
22 tons Lead, December.....	3.70¢	
MONDAY, October 29.		
16 tons Lead, spot.....	3.65¢	
TUESDAY, October 30.		
10 tons Tin, spot.....	23.00¢	

Financial.

The Presidential year 1888 is no exception to the rule that dullness in business is characteristic of the few days that immediately precede the casting of the vote. Nevertheless, in most lines there is a fair degree of activity, and indications generally are unusually favorable. The marketing of the crops is in larger volume as the season advances and the traffic returns from the various lines of transportation indicate a movement largely in excess of the corresponding date last year. The approach to the closing of navigation, as well as the movement of the corn crop, encourages the view that before long rates will be established upon a more stable basis. The one disquieting feature is the small volume of exports. The aggregate returns of leading clearing houses are also larger in comparison. There is certainly no retrograde movement. It is to be observed, further, that those points recognized as peculiarly industrious, such as Pittsburgh, Detroit, Cleveland, Philadelphia, Worcester and Lowell, all report substantial gains. Local reports refer to a fair trade among dry goods jobbers. In groceries the South is among the heaviest buyers in the market just now, and collections from that section are said to be unusually good. One of the leading houses reports that collections even in Florida, outside the yellow fever districts, are better than before for many years. Coffee is about the weakest on the list, sugar is slack, and other goods somewhat nominal in the absence of business. The position of breadstuffs is more confident, but speculation is still active and actual transactions are unimportant. Corn is offered freely at a decline. Cotton spot stock is steady, with a better demand. Provisions are controlled from Chicago—

spot and future stuff for export as dull as ever. The Florida orange crop, just coming to hand, is pronounced the largest ever known and in fine condition. The President has appointed Spencer B. Newbury and Rush C. Hawkins, of New York, to be assistants to the United States Commissioner General to the Paris Exposition.

Stocks were well supported early in the week, partly on buying orders from London, but toward the close prices were weaker, with few exceptions, in consequence of losses from railroad operations, particularly among Eastern roads, although at one time Reading led in the decline, being affected by the unfavorable financial statement. It was considered likely that the complaints to the Interstate Commerce Commission against the Lehigh Valley for discrimination were responsible for some selling of the coalers. The Terminal group again on Saturday lost fractionally on the current talk of legal difficulties attending the lease of the East Tennessee to the Danville and the sale of Georgia Central to Terminal. On Monday bears gave special attention to the coalers, following up their previous sales of Reading with further selling of both that stock and Lackawanna. The suits of Cox Bros. & Co. accounted, it was said, for these sales in large measure, as the decision in the cases may have some bearing upon the business of other Coal roads than the Lehigh Valley, the one directly interested. On Tuesday there was a vigorous raid upon New England, Reading and the grangers, which had an unsettling effect upon the whole list, but the tone was stronger at the close.

Government bonds were steady and unchanged, as follows:

U. S. 4½s, 1891, registered.....	108½
U. S. 4½s, 1891, coupon.....	108½
U. S. 4s, 1907, registered.....	127½
U. S. 4s, 1907, coupon.....	127½
U. S. currency 6s.....	121½

Up to date the Government has purchased under the April circular \$51,392,000 4s and \$38,355,350 4½s. The 4s have cost \$66,005,539 and the 4½s \$41,866,634, and the saving to the Government in anticipating their redemption before maturity is about \$26,500,000.

Foreign exchange was firmer, with posted rates \$4.84½ @ \$4.88½. Although the exports from New York for September were smaller than for any previous September for 12 years, the foreign commerce of the country as a whole is shown by the monthly report from Washington to have been more favorable than was expected. The total exports for the month were \$54,112,117 and the imports \$56,691,490. For the same month last year we exported nearly \$3,500,000 more in produce and manufactures and imported \$2,000,000 more of foreign merchandise. But for September of this year we have imported \$13,000,000 less of gold and silver, and have exported nearly \$1,000,000 more of coin and gold bars, which accounts for the fact that the outgoing volume nearly balances the incoming tide. The following is a comparison of the returns from January 1 in each of the last three years:

	1886.	1887.	1888.
Total exports.....	\$545,639,205	\$517,622,990	\$495,845,741
Total imports.....	525,022,023	576,108,528	561,264,536
Excess of imports.....		\$58,484,568	\$65,418,795
Excess of exports.....	\$20,616,182		

For the first nine months of 1888 the excess of exports was \$52,746,789, making a difference between this year and that of \$118,165,584, which is accepted as quite sufficient to account for the prevailing depression in business. At the same time the present condition of the market for foreign exchange is pointed at as evidence that the large balance has been settled by the exports of American securities. Respecting the present case in London,

monetary writers there describe the situation as factitious, as future heavy calls for gold are looked for from Russia and the Argentine Republic.

The weekly bank statement shows a decrease of \$1,200,000 in surplus reserve, which now stands at \$15,698,400, against \$11,926,000 last year, and \$6,398,000 in the last week of October, 1886. In loans there was a slight contraction. In other respects there were no important changes. The call for currency continued heavy in the South. Time loans are easier, being quoted at 3¼ % for 60 days and 4 % for four to six months. The best single name commercial paper sells at 5½ @ 6½ %, and fair indorsed at 4½ %. There is a fair demand for paper, and the supply limited.

The total clearings of 38 cities last week show an increase, compared with last year, of 7.2 %; outside of New York, 10.5 %. New York increased 5.4 %; Boston, 21.8 %; Philadelphia, 17.7 %; Chicago, 6 %; St. Louis, 6.4 %; Pittsburgh, 12.5 %; New Orleans, 4.2 %; Kansas City, 20.9 %; Milwaukee, 8.2 %; Minneapolis, 3.7 %; Omaha, 28.2 %; Denver, 14.4 %; Detroit, 34.2 %; Cleveland, 10.3 %; Memphis, 10.4 %; Hartford, 11.6 %; Peoria, 23.9 %; Grand Rapids, 18.3 %; Topeka, 14.1 %; Baltimore, decrease, 1.9 %; San Francisco, 12.2 %; St. Paul, 10.02 %; Galveston, 9.1 %; Indianapolis, 11.2 %; Columbus, 4.9 %; Wichita, 15.8 %; Duluth, 30.9 %; Norfolk, 9.7 %, and St. Joseph, 25.8 %.

The exports of specie from this port during the week amounted to \$969,000 and the imports to \$98,000. Since January 1 the amounts respectively are \$30,842,000 and \$6,396,000, against \$14,597,000 and \$37,765,000 in 1887. It is announced that a strong New York syndicate, including many influential capitalists, have bought a very large interest—about \$1,000,000—in the company owning the city of Annistown, in Alabama. The organizer of the syndicate is William Henry Woods.

The importations of merchandise at this port during the week were valued at \$9,100,000, of which \$2,000,000 represent dry goods. Since January 1 the total is \$385,840,712, as compared with \$390,470,937 for the same time last year. The exports were \$6,512,317; not a bushel of wheat was included, yet speculators are indifferent. Some 15,000 sacks flour were bought by English shippers—the first in a long time.

The St. Louis National Bank, which has been a United States depository for 20 years, will close its Government accounts, the business being no longer profitable.

Coal Market.

The Anthracite Coal trade is comparatively dull, although a fair amount of business is in progress. In the face of a continued large production at the mines and a lessened demand, prices have a softening tendency. Stove is the only size not in excess, and in consequence the full circular is not insisted upon as rigidly as a short time ago. It is announced that there will be no advance in November. Red Ash is scarce. The one marked feature is the enormous output for the week, aggregating 886,469 tons. This is a decrease of 82,000 tons compared with the previous week, but the amount is fully up to the average since the commencement of the active season, and is 139,000 tons larger than for the corresponding week last year. Since January 1 the total is 31,206,000, as compared with 28,287,000 tons for the corresponding period in 1887. The output from the Schuylkill region is the same as for the previous week, but the Lehigh reports 31,000 tons less and the Wyo-

ming 52,000 tons less. The Lackawanna, it is said, has reduced the working time. Quotations are unchanged—viz: Hard White Ash, Lump, \$4.50; Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Free-Burning, f.o.b., Broken, \$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.65; Pea, \$2.75.

The interest of the trade for the time being is concentrated on the case of Coxe Bros. & Co., now before the Interstate Commerce Commission. This firm of individual colliers, whose shipments amount to 1,500,000 tons per annum, last week filed with the Commission, at Washington, a complaint against the Lehigh Valley Railroad alleging that the road discriminates against the firm of Coxe Bros. & Co., and other shippers in favor of the Lehigh Valley Coal Company. The complaint avers that the Lehigh Valley Company is a producer of both Anthracite and Bituminous Coal, and carries Bituminous at about one-half of the rates per ton per mile charged on Anthracite; that much of the Bituminous comes in competition with certain sizes of Anthracite (Pea, Buckwheat, &c.), and that in consequence of a discrimination in favor of the Lehigh Valley Coal Company, Coxe Brothers & Co. are obliged to dump on the banks a large quantity of these sizes and allow it to go to waste. The complaint also charges that the Lehigh Valley Railroad Company, being the owner of the Lehigh Valley Coal Company, sells Coal in New York Harbor at prices below the sum of the current price for Anthracite at the mines, and the charges for transportation paid by other producers, and that in consequence of this discrimination in favor of the Lehigh Valley Coal Company that concern has been enabled to secure large contracts for delivery in New York Harbor, which were entirely out of the reach of competition by Coxe Brothers & Co. and other shippers. One of the contracts referred to is that of supplying the Manhattan Elevated Railway Company, and it is alleged that, although President Sloan, of the Delaware, Lackawanna and Western Railroad, is a director of the Manhattan Company, he is unable to compete with the Lehigh Valley for the benefit of his own road.

It is reported that a syndicate is preparing to take charge of and to expose a great coal vein along the line of the Texas Pacific. At the head of this syndicate is Col. R. D. Hunter, of St. Louis, associated with capitalists in New York and Texas, who purchased mines on the Texas Pacific, 80 miles west of Fort Worth, including 23,000 acres of Coal land. The Coal is of the bituminous variety. The company is known as the Texas Pacific Coal Company, capital, \$2,000,000.

Bituminous Coal is active, and the supplies are scarcely equal to the demand. Pool prices remain unchanged. Cumberland reports for the week 72,000 tons and Clearfield 58,000 tons. Shipments in either case are some 200,000 tons in excess of last year's product up to October 20.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Oct. 31, 1888.

The report has circulation that a movement is under way for an anti-syndicate "deal" in Copper, the aim of which is to transfer the control of the market from the French speculators to England and thereby overcome the existing feeling of insecurity. The impression derived from the meager information imparted is that the "deal" is practically a combination of

English and American companies. In apparently well-informed quarters it is stated that indications are very promising for the consummation of the project and the elimination of the purely speculative interest, but as to the date the proposed combination would go into force, and regarding the result upon existing contracts with the French syndicate, no satisfactory information is given. Speculation in both Chili Bars and G. M. B. Copper has been very quiet again, and consumers are still indifferent buyers, not only of Bars, but of furnace material.

The week's operations in Block Tin have been large (the best part of 1000 tons, all told), but the market showed less spirit the last few days. The position continues to favor a strong market, and the Batavia sale of Billiton, realizing as it did £2 above European quotations, served to infuse more or less tone. Offerings, however, have been liberal enough in the local market to operate against a rise, and to-day's prices are the lowest of the week.

There has been no radical change in the Tin-Plate market. The demand continues fairly active, but buyers and sellers are still apart on prices, and new contracts are thereby restricted. Makers have the books full for the next 30 days and are turning out about 125,000 boxes per week. Prices are maintained on prompt deliveries, but irregular on futures. The labor difficulty at the Margam works has been settled and the mills are in full operation.

Pig Iron has been in more active demand for consumption, and this, together with the fact that five furnaces have been damped, thereby reducing the supply considerably, gives the market a stronger tone. Activity is still reported from the Steel works in nearly all sections, and manufacturers have orders booked that will keep them busy the balance of the year. In some cases new orders are being refused. Additional Steel plant is being erected in several localities.

The market for Old Iron Rails has continued slow, and holders, who have been expecting large American orders, express disappointment. Prices for these and for Old Material generally are nominal in a great measure, owing to the moderate trade passing. Offers of Old Rails have been made at lower prices.

Scotch Pig—Apart from 1/6 decline on Summerlee there has been but slight variation in prices. Business has been fair as a whole.

No. 1 Coltness, f.o.b. Glasgow	49/6
No. 1 Summerlee, " "	49/6
No. 1 Gartsherrie, " "	47/6
No. 1 Langloan, " "	49/
No. 1 Carnbroe, " "	43/
No. 1 Shotts, " at Leith	49/
No. 1 Glengarnock, " Ardrossan	47/6
No. 1 Dalmellington, " "	42/6
No. 1 Eglinton, " "	41/6
Steamer freights, Glasgow to New York, 6/6	
Liverpool to New York, 10/.	

Cleveland Pig—The market has shown little change, demand running fair and prices ruling steady. No. 1 Middleboro', G.M.B., 37/; No. 3 do., 34/6.

Bessemer Pig—There continues to be an active business in this branch and prices are very firm. West Coast brands, mixed numbers, 45/3, f.o.b. shipping point.

Spiegeleisen—The demand continues fairly active and prices remain firm. English 20% quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails—There is still a large business. Prices are variable, but the market quite strong in tone. Standard English sections quoted at £3. 18/9 @ £4, f.o.b. at N. W. England shipping point.

Steel Blooms—Demand has been slow, and transactions are reported at slightly lower prices. We quote £3. 18/9 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets—In these there is still an active trade, and prices remain very firm. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs—The demand continues moderate, and makers have accepted lower prices. Bessemer, £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Wire Rods—A quiet market, and holders naming former prices. Mild Steel No. 6 quoted at £5. 19/3 @ £6 and No. 5 at £5. 18/6, f.o.b. at N. W. England shipping point.

Scrap Iron—Demand continues moderate and former prices prevail. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Old Rails—The demand has continued slow and prices are still rather weak. Tees quoted at £3 and Double Heads £3. 3/9, c.i.f. New York.

Crop Ends—Moderate sales only, and former prices current. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate—The situation is about the same as last week, buyers and sellers being considerably apart. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/3 @ 15/9
IC Bessemer steel, Coke finish	14/ @ 14/3
IC Siemens	14/3 @ 14/6
IC Coke, B. V. grade	13/6 @ 13/9
Charcoal Terne, Dean grade	12/ @ 12/6

Manufactured Iron—Continued activity is reported in all departments and prices are strong throughout. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d. @ 8 2 6
" Common	" @ 5 7 6
Staff. Bl'k Sheet, singles	" @ 7 10 0
Welsh Bars (f.o.b. Wales)	4 17 6 @ 5 0 0

Tin—The volume of business has been large, but prices have varied to a moderate extent only. Straits quoted at £102 @ £102. 10/, spot, and £102. 15/ @ £103 for three months' futures.

Copper—The market quiet, and prices without material change. Chili Bars, £78, spot, and £78. 10/, three months' futures. Best Selected, £81. 10/.

Lead—Prices have been irregular and the market is still unsettled. Soft Spanish, £13. 7/6.

Spelter—A moderate business in this metal and prices without material change. Silesian, ordinary, £18. 17/6.

Slag Paving Stones—For some time past a number of slag paving stones have been undergoing a severe test under the heavy traffic of Broadway at the corner of Reade street. These paving blocks were made at Catasauqua, Pa., under the patents of Martin V. B. Steinmetz, of 115 Broadway. The cinder as it flows from the blast furnace is run with a ladle from which it is poured into a series of molds placed on an endless conveyer which carries them to air-tight annealing ovens in which they are allowed to cool gradually. Tests of the blocks made by the Department of of Public Works showed crushing strength of 9,674, 12,161, 12,100 and 11,806 pounds respectively in four different samples.

The inventor claims that he can produce these paving blocks at about 1 cent a piece, while granite blocks cost from 7 to 8 cents a piece. While the latter polish under heavy traffic, the slag blocks wear rough. The cost of the plant is relatively small.

Foreign Markets.

EQUIVALENTS.		Cents.
Franc, Peseta or Lira.....		19.3
Florin (Netherlands).....		40.2
Florin (Austria).....		35.9
Wire (Portugal).....		1.08
Wire (Brazil).....		54.6
Mark (Germany).....		23.8
	Pounds.	2.205
Kilogram.....		134.
Picul.....		134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, September 28, 1888.—*Asphaltum*.—A brisk export demand has prevailed at \$14.04 per ton f.o.b., including the export duty for boiled, and \$6.84 crude. There have been exported from the island, so far this year, 41,372 tons, as compared with 32,681 last year, and 30,450 in 1886. *Exchange*, 90 days' sight, on London, \$4.80 @ \$4.86.—*E. P. Masson*.

BRAZIL.

PARA, October 26, 1888.—*India Rubber*.—There is for the moment hardly any unsold stock on hand.—*Per cable direct*.

EAST INDIES.

COLOMBO, CEYLON, September 20, 1888.—*Plumbago*.—Our market has weakened somewhat; we quote at the close Large Lumps, in rupees per ton, 145 @ 170; Ordinary Lumps, 125 @ 160; Chips, 80 @ 95, and Dust, 40 @ 65. Shipments since October 1 have been as follows: To England, 74,042 cwt.; to Marseilles, 38; to Trieste, 532; to Hamburg, 12,594; to Antwerp, 6243; to Bremen, 2012; to India, 82, and to the United States, 140,469, together 236,003, against last year, 281,158; in 1886: 188,647, and in 1885: 192,192 cwt. *Coir Yarn*, Nos. 1 to 4 per cwt., 7 @ 12 rupees. *Ebony*.—Some sales have been effected at 85.50 rupees per ton. *Exchange*, six months' sight, on London, 1/5 3-32.—*Volkart Brothers*, represented by Mr. John W. Greene, 82 Wall street, New York.

MANILA, October 22, 1888.—*Hemp*.—Has been inactive and may be quoted nominally \$11 per picul, against \$9.50 same date last year, equaling per ton, cost and freight, £37. 7/6, against £33. 17/6. Clearances for the United States since last cable, 9000 bales, against 12,000 same time last year; since January 1, 172,000, against 190,000; loading for ditto, 53,000, against 45,000. Cleared for England since January 1, 283,000 bales, against 183,000; loading for ditto, 2000, against none. Cleared for other countries, 59,000, against 34,000. Receipts at all ports since last cable, 9000, against 27,000; ditto since January 1, 515,000 bales, against 431,000 in 1887 and 329,000 in 1886. *Freight*, \$6, against \$5.50; *Exchange*, six months' sight, 3/8%, against 3/8%.—*Ker & Co. to Mr. Charles Nordhaus*, their agent, 89 Water street, New York, per cable direct.

PENANG, September 19, 1888.—*Tin*.—During the fortnight the receipts amounted to 14,500 piculs, of which Europeans bought 8500 and Chinese 6000. The market, under the influence of London cable fluctuations, improved from \$35.90 per picul to \$38.85, receded to \$36.90, and winds up at \$37.35, at which latter figure Chinamen bought. Previously Europeans purchased at \$38 and Chinese at \$38.30.—*Schmidt, Kustermann & Co.*

SPAIN

BILBAO, October 13, 1888.—*Metals*.—As per official returns shipments of Ores and Metals from Spain during the first seven months were as follows:

	1886.	1887.	1888.
	Tons.	Tons.	Tons.
Calamine.....	18,675	19,849	19,770
Pyrites.....	416,931	470,230	494,348
Iron Ore.....	2,566,609	3,159,987	2,743,582
Pig Iron.....	35,655	72,774	41,640
Precipitate.....	15,718	16,409	15,745
Quicksilver.....	519	1,105	865
Pig Lead.....	62,565	77,037	73,092

Totals... 3,116,672 3,817,391 3,389,042

The foregoing table shows that with the exception of Pyrites there has so far been a decrease in every item. *Iron Ore* in our own market remains in good position; it would be more active still but for the scarcity of steamers, which keeps some crops idle. We quote:

Rubios, 7/ @ 7/3, and Campanil, 8/ @ 8/3. Shipments thence so far, 2,960,883 tons, against 3,476,257 tons last year. Of *Pig Iron* 2100 tons went to Italy this week and 340 tons were shipped coastwise. The Barcelona International Exhibition proves such a success that it is to last till December 31.—*Bilbao Marítimo y Comercial*.

AUSTRALIA.

MELBOURNE, Oct. 4, 1888.—*Iron*.—Importers have tried to raise prices, but so far in vain; the market is well sustained and the tendency rather upward than downward. We quote today: Galvanized Iron, £17. 10/-; Fence Wire, £9. 10/-, and Iron, £6. 15/-. Fortnight's *Tin* shipments were 375 tons from the mainland and Tasmania.—*Per cable from Europe*.

GERMANY.

HAMBURG, October 20, 1888.—*Iron*.—The position of *Pig Iron* has gradually improved inasmuch as in spite of a slightly increased production stocks decreased 400 tons in August, while in July they had increased 11,000 tons in Rhenish-Westphalia. The orders received for Spiegel partially extend into the first quarter of 1889; the quotation remains steady, 53 marks per ton for 12 % Manganese. This barely covers cost of production; a good demand continues to prevail. *Forge Pig* has also been in better request, but at not very remunerative rates, Siegen selling good quality at 47 @ 48 marks per ton, but syndicate clings to 50 marks. Foundry *Pig* has been raised 2 marks per ton in consequence of the extraordinary demand for the same. *Bessemer Pig* has been raised 1 mark. The quotation for Luxembourg White is 37.15 marks; for Gray, 42.40; English *Bessemer* has declined 2/ @ 44/6 for mixed lots on the West Coast. Merchant *Iron* has been in diminished demand. Beams are as lively as ever; Hoop *Iron* is a little more so, yet it sells very low. The inquiry for Boiler Plates, instead of abating, on the contrary is even more pressing and general. Thin Sheets have been looking up slightly too. There are indications of an impending revival in the Wire branch generally. Machine shops and foundries continue doing well, so much so that the latter are about to raise their prices. Car works are very busy. The quotations are as follows at the works: Merchant *Iron*, 125 @ 127.50; Boiler Plates, 170; Tank Sheets, 150; Steel Sheets, 160; Car Wheels, 315; Loose Axles, 230; Hoops, Steel, 215 @ 230; Steel Rails, 115. Prospects for the renewal of the International Steel Rail Syndicate are even worse now than before. Advices from Upper Silesia in every branch of the *Iron* trade remain of the most encouraging kind. *Metals*.—Lead is firm in this city, and both Copper and Spelter are steady.—*Borsenhalle*.

Legal Decisions

CARRIER AS WAREHOUSEMAN.

T. forwarded tin by a carrier, and the bill of lading provided that the carrier should not be liable for loss by pirates, robbers, thieves, &c., whether such perils or things arise from the negligence, default, or error of judgment of the pilot, master, mariners, engineers, stevedores, agents, or other persons in the service of the shipowner, and occur before, during the voyage, or at the port of discharge. The ship arrived on the 25th of November, and notice of arrival was given the consigners the same day; the goods were discharged on the 27th of November, but were not removed from the wharf until November 29, when it was discovered that a large part of the tin had been stolen. The wharf was the private wharf of the carrier, and it did not permit any removal of goods unless a receipt was given. In this case, however, no receipt was given. T. sued for his loss, and the trial court decided 1, that the carrier was liable as a carrier; 2, and, if not, it was liable as a warehouseman. The case—*Tarbell vs. Royal Exchange Shipping Company, Limited*—was carried, after a reversal by the general term, to the Court of Appeals of New York, where the plaintiff finally succeeded. Judge Andrews, in the opinion, said: "1. The company had ceased to be a carrier, as they had given notice of arrival, had discharged the goods, and there was sufficient time to remove them. 2. The tin was taken away

from the wharf through the negligence of the carrier, who then was a warehouseman, and this negligence was so gross that it was liable for the loss. 3. The exemption of the carrier from loss by theft cannot be made available to relieve the carrier when he becomes a warehouseman."

INTEREST.

A promissory note provided for "interest from this date (date of the note) at the rate of 8 per cent. per annum, payable as per five interest notes hereto attached." The note was sued upon, and it was claimed that this declared rate of interest, 8 per cent., should be continued even after the maturity of the note. The legal rate of interest was 7 per cent., and the court would not allow more than that rate from the maturity of the note. In this case—*Sherwood vs. Moore*—on the appeal to the United States Circuit Court, Northern District of Georgia, the judgment below was affirmed. Judge Newman, in the opinion, said: "It may be considered as settled, I think, in the Federal courts, controlled as they are by the decisions of the Supreme Court of the United States, that if a conventional rate of interest higher than the ordinary legal rate is stated in a promissory note, such higher rate will not be allowed beyond the maturity of the paper, unless the terms of the instrument itself extend it beyond maturity. There is a qualification, however, to this ruling by the Supreme Court—namely, that the local law of the State will control—and it is claimed here by plaintiff's counsel that a different rule has been established in Georgia. I do not construe the decisions of this State as he does on this question, and am of the opinion that only the legal rate of interest can be allowed here. The presumption of the law was that this note would be paid at maturity. Such must be held to have been the expectation of the parties. An implication will not arise when, in the absence of evidence, it must be based upon a presumption which does not exist. A contract to pay a higher rate of interest than the ordinary legal rate will not be extended beyond its term. If it is desired that the indebtedness shall bear such higher rate of interest beyond maturity, the contract should provide for it. In my opinion, in this case interest at the rate of 8 per cent. per annum ceased at the maturity of the note, and judgment must be entered for interest at the rate of 7 per cent., the legal rate, from the maturity of the note."

A gang of men were repairing the iron truss bridge which spans the Big Muddy River, in Illinois, on Tuesday, and an order was given to loosen a girder, one of the main supports. One turn of the wrench swung the bridge out of plumb, and the vast mass dropped to the water, 50 feet below. The bridge was the largest one of the kind in the State—170 feet in the clear.

Alex. Laughlin & Co., engineers and contractors, Wade Building, Cleveland, Ohio, have opened a branch office at Knoxville, Tenn., under the management of Evan Jones.

The Nordyke & Marmon Company, of Indianapolis, Ind., are filling an order for a small flour mill, ordered by an Englishman. It is to be located at the gold fields near Natal, South Africa. It will be driven by a large American windmill, that being the only available power in that far-away clime, and will be shipped via New York, Liverpool and Cape Horn to Natal, and then by wagon for about 300 miles to destination.

Hardware.

During the past week there has been a perceptible diminution in the volume of business, which is owing in good part to the fact that it is the closing week of the month, as well as to the increased attention which is being given to politics. In trade matters there is little new or important to record, though some changes in price have been made, and others of importance are being considered. The condition throughout the country is regarded as very satisfactory.

Cut Nails.

The New York market in Cut Nails is very quiet, few sales of any consequence being made, the basis remaining \$1.80 @ \$1.90 for carload lots on dock, and \$1.90 @ \$2.00 in small lots from store. Considering the fact that Nails would not net more than \$1.65 @ \$1.70 at Wheeling for sales over the greater territory east of the Allegheny Mountains, Eastern manufacturers attach little importance to possible threats of invasion. We understand that the consummation of the Western Cut Nail Association is dependent upon the consent of one manufacturer, who has just returned from Europe.

Barb Wire.

The market in this city is affected, in sympathy with the low prices and weak tone of the Western market, and prices are slightly lower. As a general quotation for Four-Point Galvanized, 3.55 cents to 3.6 cents may be named, with concessions for carload lots. Reports from the West indicate that low quotations on Barb Wire are being made, 3.35 cents for Galvanized and 2.75 cents for Painted being named on car lots. Staples, plain, are quoted at as low as 2.70 cents, and Galvanized at 3.30 to 3.35 cents, free on board cars at factory. It is to be observed that the usual difference between Painted and Galvanized Wire is not in all cases observed, and that Staples are also offered at low prices.

Miscellaneous Prices.

J. F. Wollensak, Chicago, Ill., makes the following quotations on his Transom Lifters and other goods:

Transom Lifters.	Discount.
Bronzed Iron, class 3 and 4.	50 %
Bronze Metal, class 3 and 4.	25 %
Brass, class 3 and 4.	35 %
Crown and Star.	50 %
Eagle and Shield.	50 %
Skylight Lifters.	35 %
Sash Centers.	50 & 10 %
Letter Boxes.	25 & 10 %
Tinned Malleable Iron Door Keys.	50 & 10 %

The following are revised prices of tools manufactured by W. G. Avery Mfg. Company, Cleveland, Ohio:

	Discount.
Saw-Set and Punch.	30 & 5 %
Revolving Punch.	30 & 10 %
Bevel and Square.	30 & 10 %
Bevel Protractor.	30 %

Jewett & Leonard, Grafton, Mass., manufacture the Champion Horse and Cattle Cleaner in two styles, one of which has a scalloped edge and is designed for long-haired heavy-coated horses. The other has a smooth edge for sensitive or clipped horses. These Cleaners are sold to the retail trade at \$2.75 per dozen.

The Moore Mfg. and Foundry Company, Milwaukee, Wis., issue under date November 1, the following discount sheet: Terms, 60 days or 3 per cent. discount for cash in 10 days, goods f.o.b Milwaukee or Chicago:

	Discount.
"Acme" Barn-Door Rollers.	55 %
Baggage Car-Door Hangers.	33 1/2 %
Brackets, for Rail.	25 %
Carriers, for Hand Hoists.	20 %
Ceiling or End Pulleys.	40 %
Chain, Long Haul.	25 %
"Climax" Barn-Door Hangers.	55 %

"Climax" Barn-Door Hangers, Wood Track.	55 %
Differential Pulley Blocks.	40 %
Dumb Waiter Pulleys.	50 %
Hay Fork Pulleys.	40 %
Hooks, Floor.	40 %
Hand Hoists.	20 %
Hand Hoists, Stationary.	20 %
Log Binders.	25 %
"Novelty" Tackle Blocks.	50 %
"Novelty" Snatch Blocks.	50 %
Parlor-Door Hangers.	50 %
Parts for Differential Blocks and Hand Hoists.	40 %
Rail road Hangers.	55 %
Rail, Double-Flange Barn-Door, per 100 feet.	\$1.50, net.
Rail, Extra Heavy, for No. 5 Railroad Hangers, per 100 feet.	\$3.50, net.
Rail, Channel, for "Zenith" Hangers, per 100 feet.	\$2.50, net.
Rail, Wrought-Iron.	25 %
Rollers, for Heavy Doors.	50 %
Sash Pulleys.	50 %
Shears for "Novelty" Blocks.	50 %
Side Pulleys.	50 %
Sliding Door Sheaves.	50 %
Street Car-Door Hangers.	50 %
Stay Rollers.	70 %
Tackle Blocks, Japanned.	50 %
"Universal" Door Hangers.	45 %
Vises, with Offset Jaws.	20 %
"Wild West" Door Hangers.	45 %
Wood Track Barn-Door Hangers.	55 %
"Zenith" Barn-Door Hangers.	55 %

L. M. Devore, Freeport, Ill., manufacturer of the New Idea Curry Combs, quotes them at the following prices. Terms, 30 days, with a discount of 2 per cent. for cash in 10 days:

	Per doz.
No. 1—Flexible Back, Russet Leather.	\$3.00
No. 2— " " Patent Leather.	2.50
No. 3— " " Sharp Tooth.	2.25

James L. Haven Company, Cincinnati, Ohio, announce the following special prices, the pages being those in their discount index No. 123:

Page.	
No. 6 Axle Pulleys, 2 inch, per doz.	\$0.20
4, Bedstead Fasteners, per lb.	.03
5, Tire Drills, No. 2, per doz.	15.00
6, Chain Pump Chain, no button, per lb.	.04 1/2
6, " " " with " "	.05
6, Wood Chain Pump, curbs complete, per doz.	13.75
6, Wood Chain Pump, curbs bolted, per doz.	16.75
6, Wood Chain Pump, curbs, no iron-work, per doz.	8.75
8, Dog Irons, per lb.	.02
9, Grindstone Fixtures, No. 25, per doz.	2.60
9, " " " No. 27, " "	2.80
10, Ox Shoes, per lb.	.05 1/2
10, Tailor Irons, per lb.	.04 1/2
10, Plow Clevises, per lb.	.04 1/2
11, Stove-Lid Lifters, off net list.	10 %
13, Corn Shellers, Eagle, each.	5.50
13, " " " I X L, " "	5.25

The Ammunition Association have recently held several meetings, in which matters connected with their organization have been under consideration, with a view to determining the best methods to be adopted to correct the irregularities which have recently existed. No decision has yet been reached, and it remains to be seen what changes, more or less radical, in the existing system it will be deemed advisable to make.

The manufacturers of Wagon and Carriage Springs are in session, and the question of prices is receiving attention. It is understood that the steel used in making these goods has been withdrawn from the combination which has heretofore regulated its price, and that materially lower quotations are made on it. It is thought probably this may have some effect on the prices of Springs, but on this point at the time of writing no definite decision has been reached.

An important meeting of the manufacturers of Nuts was held at Buffalo, N. Y., October 26, all of the members of the association being present. As stated below, a slight advance in prices was made, and action was also taken regulating the prices of Hexagon Nuts, which have recently been in open market. The revised quotations are as follows, terms 60 days or 2 per cent discount for cash:

	Off list.
Square Nuts, Plain, Cold Punched.	5.4¢
Square Nuts, Plain, Hot Pressed.	5.4¢
Hexagon Nuts, Plain, Cold Punched.	5.5¢
Hexagon Nuts, Plain, Hot Pressed.	5.9¢
Square or Hexagon C. T. R.	5.2¢

A slight discount for quantity purchased during the balance of the year was also determined upon. Deliveries remain as before.

The Sash Weights of the T. B. Harkins Foundry Company, Bristol, Pa., in carload lots delivered in New York are \$23 per ton. They are made on a molding machine of Mr. Harkins' invention, and their regularity and smoothness of finish are points made in regard to them.

A. J. Phillips & Sons, Fenton, Mich., have put on the market several new Snow Shovels for the present season. Their No. 20 is to meet the demand for a strong and durable article of greater capacity than their other Shovels, and has a sharp ice-cutting malleable iron top, and is put together by an improved method. Their No. 22 is made after the pattern of their No. 2, and is intended to take the place of their old No. 3 as an extra cheap Shovel. They are also introducing a new fancy toy Shovel, which is described as handsomely plated, stenciled and varnished and a plain toy Shovel for children. In addition to these goods they are making a special Shovel of the Bishop pattern for New England trade. The following are the prices on their line of Snow Shovels:

	Per doz.
No. 1, long handle.	\$2.00
No. 1, long or short D handle.	2.20
No. 2, long handle.	1.90
No. 2, long or short D handle.	2.10
No. 3, long handle.	1.60
No. 20, Ice Cutting Tip.	3.00
No. 20, Bishop pattern.	3.00
No. 20, special.	2.75
No. 22, Iron Tip.	1.85
Boys' Shovels.	1.50
Boys' Shovels, D handles.	1.70
Plain Toy Shovels.	1.50
Fancy Toy Shovels.	2.00
Single Snow Scrapers.	2.25
Double Snow Scrapers.	2.75

Their circulars also represent patent Double Scrapers and Single Scrapers, both of which are furnished with Steel Shovels. The Double Scraper is made to push or pull.

F. S. Dangerfield, Auburn, N. Y., quotes his Igniting Match Box at \$1.50 per dozen, with Cigar Clippers \$2.00, delivered.

Postal Package Company, Baltimore, Md., issue a circular, October 10, giving prices on their Perfect Postal Packages in lots of 100 to 1000, mentioning a discount of 30 per cent.

•Items.

The Hardware Merchants' and Manufacturers' Association of Philadelphia opened their new rooms in the Drexel Building on Tuesday evening, October 16. The meeting was called to order at 6 o'clock, and after the routine of business was disposed of the members, 23 in number, adjourned to the Bullitt Building, where an excellent dinner, lasting nearly four hours, was enjoyed. The occasion is referred to as one that brought out much talent in connection with the toasts, songs and other exercises. The association was organized through the instrumentality of Samuel Disston, of Henry Disston & Sons, on the occasion of a supper given to members of the trade at his residence, February 6, 1886, and has held meetings regularly each month since that time. These meetings have been productive of a warm and friendly feeling among the members, in addition to the correction of some abuses that had existed in the trade. Its present officers have held their positions since its organization and are as follows: W. J. Lloyd, president; Fayette R. Plumb, vice-president, and E. D. Eyre, secretary and treasurer. There is also a standing executive and grievance committee. The association contemplates having a complete library of price lists of Hardware manufacturers of the country, and we take pleasure in mentioning to manufacturers the fact that

the association desires that the latest editions be sent to their rooms, 912 Drexel Building, Philadelphia.

A. W. Kingsland, who was for many years connected with the Northwestern Horse Nail Company, of Chicago, and in that capacity became well known to the Hardware trade of the West, has been appointed general agent of the Au Sable Horse Nail Company, of New York. He has opened an office at 142 Lake street, Chicago, and will carry a stock of Nails, from which prompt shipments can be made to buyers in the section tributary to that city.

The Hiram Holt Company, E. Wilton, Maine, manufacturers of the Lightning Hay Knives, have completed their new shops, and since the middle of September have been running them overtime. These shops are said to be exceptionally fine and complete, and are the only ones, we believe, run exclusively in the production of Hay Knives. The demand for the Lightning Hay Knife has been unusual this season, and the stock of finished goods on hand at the time of the fire was exhausted sooner than the company expected. Hence there was some unavoidable delay in filling orders. The company are now, however, in condition to respond promptly to all demands. In this connection the company advise us that they have been informed that Hay Knives branded Lightning Pattern are being quoted among jobbers, and desire it to be understood that Lightning as applied to Hay Knives is their exclusive property, and as a trade-mark has been duly registered, so that the use of this name by other parties will promptly be proceeded against according to the law relating to trade-marks.

The Hardware Trade Cleveland and Thurman Association, with headquarters at 27 Chambers street, participated in the business men's parade last Saturday, and the Harrison and Morton Hardware Club are making arrangements for the parade next Saturday.

The Moore Mfg. and Foundry Company have removed their office and wareroom from 51 and 53 Franklin street, Chicago, to their works at Fowler and Nineteenth streets, Milwaukee, Wis. They have just put their new plant in operation. It consists of a completely equipped machine shop, foundry, forging rooms, and japanning and annealing ovens. They will manufacture their own line of Hardware Specialties and will compete for orders for gray iron castings, light machine work, forging and japanning. They have just issued a 50-page catalogue devoted to their line of goods. In its pages they illustrate and describe off-set jaw vises, Wild West and Climax door hangers, railroad hangers, rails and fittings for hangers, Novelty tackle blocks, hay-fork pulleys, log binders, carriers for hand-hoist and differential blocks, differential pulley blocks, portable and stationary hand-hoists, anti-friction sash pulleys, sliding-door sheaves, dumb waiter pulleys, door rollers for heavy doors, street-car door hangers, wood track hangers, Acme barn door rollers, detachable log haul chains, endless chains, or links for chains, ice elevator chains, &c. Complete price lists accompany the descriptions of the various articles included in the contents. The catalogue is well printed on good paper and is of convenient size.

Sidney Shepard & Co., Buffalo, N. Y., have issued a new catalogue of goods manufactured and for sale by them. It relates to Stamped Ware, Deep and Shallow Pieced Tinware, Japanned Ware and miscellaneous goods. In the latter department are represented some of the specialties of the company. Creamery Pails and Trimmings are also represented,

as well as Coal Vases, Toilet Ware, &c. For the information of the trade a list of the goods kept in stock in addition to their manufactures is appended.

E. T. Barnum, Detroit, Mich., in his fall catalogue No. 160 illustrates a variety of Wire articles, Wire Cloth, Counter Railings, Crestings, &c., and calls attention incidentally to other articles in his line. His catalogue No. 163 is devoted to Builders' Wire and Ironwork, and relates especially to Crestings, Roof Crestings, Finials, Town Ornaments, Office Railings, Mangers, Hay Racks, &c., Stair and Balcony Railing and Wrought Iron Fences.

J. F. Wollensak, Chicago, Ill., issues a circular devoted to Electric Bell Sets. The style of box in which each set is put up is shown, and also other illustrations given representing the goods and the manner in which they can easily and efficiently be displayed.

The Herendeen Mfg. Company, Geneva, N. Y., issue a pamphlet entitled "How Shall We Heat," in which reference is made to Open Fireplaces, Hot-Air Furnaces and steam or hot-water systems. The Furman Heater, which may be used as a hot-water or steam generator, is especially referred to, and its durability and simplicity as well as its efficiency in operation alluded to.

The Hardware store of Weaver Brothers, at Downs, near Bloomington, Ill., was destroyed by fire on the 26th ult., involving a loss of \$5000.

A corporation will be formed under the style of the C. H. Gurney Company to succeed the firm of C. H. Gurney & Co., 247 Lake street, Chicago, manufacturers' agents for the sale of Hardware.

Charles A. Wright, a prominent Hardware merchant of Aurora, Ill., died on the 20th inst. He was an old citizen of that place and was universally esteemed for his many excellent qualities of head and heart.

Haff & Walbridge, 76 and 78 Leonard street, New York, issue a catalogue relating to the line of notion specialties which they manufacture. The goods are intended for the notion, stationery and Hardware and druggists' sundries trade. It includes a line of Corkscrews, Razor Strops, Thermometers, Tape Measures, Button Hooks, Match Stands, Pencil Holders, &c.

H. T. Wakeman, successor to Browning, Sissum & Co., manufacturers of Belt Hooks, Cotters, Spring Keys, D Rings, Staples and other goods in this line, will continue the business of the late firm at the old stand, 85 Chambers street, New York.

James L. Haven Company, Cincinnati, Ohio, issue a circular relating to the Little Giant Corr. Crusher in which a full description is given, with testimonials. They also issue in leaflet form illustrations of their Iron Chain Pump Curbs and Wood Chain Pump Curbs, of which list prices are also given.

Gage & Joost, 243 Water street, New York, are sole agents in the United States for Anti-Rust. This is a preparation for preventing rust on nickel-plated work, polished edges and all bright metal surfaces.

The trade will observe the advertisement of Joseph Churchyard's Sons, Buffalo, N. Y., in which they call attention to the line of Refrigerators, Ice Chests, &c., which they are manufacturing. In this departure they are putting a new line of goods on the market and are in position to take the orders of the trade for the coming season. The name of the concern is doubtless familiar to most of our readers through the reputation they have on

Bellows, and it has been facetiously remarked that they are in this departure like the man in Grimm's fable who blew hot and blew cold, as they have been blowing hot for years with their Bellows and are now blowing cold with their Refrigerators, and it is intimated that by judicious use of their different products the public should be able to maintain a comfortable temperature. With reference to their new line of goods, they claim to have a non-condensing Refrigerator, and refer to their styles as new and different from any now offered to the trade.

Haydock & Bissell announce an auction sale, November 14 and 15, at their rooms, 12 Murray street and 15 Park place, New York. The sale covers a large line of Table and Pocket Cutlery, and also goods suitable especially for holiday trade. Full particulars will be given in our next issue.

In the catalogue of the Gould Mfg. Company, Seneca Falls, N. Y., to which we referred in our last issue, there are a great many new goods represented which are deserving the attention of the trade.

The Collins-Gibbons Mfg. Company, St. Louis, Mo., issue a circular describing their Automatic Wire Straightening and Cutting Machines and the Little Giant Wire Cutter, to which we shall have occasion to refer hereafter.

The E. C. Meacham Arms Company, St. Louis, Mo., have issued a 50-page price list, October 20, in which they represent a large line of Arms, Ammunition, Sporting Goods, &c. List prices with discounts in characters are given, a key to the quotations being also furnished.

Tendencies In Trade.

Referring to the general tendencies in the trade, especially in regard to the proportion of goods purchased from manufacturers and jobbers, we have the following advices for our subscribers in different parts of the country:

Marshalltown, Iowa.—As I observe it, the character of the Hardware business is undergoing a change. I find it growing less legitimate each year in this: that Hardware is no longer a proper word to express the merchandise that so-called Hardware dealers sell. This idea applies more particularly to the larger jobbers in the Western Central States. I observe that the combined small jobber and large retailer is growing more numerous throughout the United States, and that the purchases of this class, as well as the purchases of the better retailers only, are made from the manufacturers. The larger jobbers, to meet this, are placing these other goods, doing so to maintain former volume and income. As I see it, the manufacturer is getting nearer the consumer through the afore mentioned lesser jobbers and retailers. The jobbing business is not increasing in the ratio that consumption is increasing.

Rock Island, Ill.—I have been in the trade over 20 years, and I think there are fewer jobbing houses now than in 1867. More places to buy goods, no doubt, but the larger number represent the manufacturers. The smaller jobbing houses have multiplied, in fact there are one or more in every good-sized town that supply a local trade, but we refer to the larger cities. New York has not a leading jobbing Hardware house that does not represent or is not a manufacturing concern. Were it the proper thing to do we might name many in that city and others that are out of business and none to take their places, except the manufacturer. Why is it that the manufacturers are placing in Chicago, St. Louis and other cities agencies and depots of supplies unless it is to reach the retail trade, and, if the retail trade did not support them, would they stay simply to supply jobbers, when they could reach them much more cheaply? Our theory is that the retailer will go the manufacturer first, because he knows what he is getting, and, if the goods are not what they are represented to be, he has no trouble in getting at the responsible party for damages. Secondly, because, if he wants a reliable, steady trade, he must have a good line of goods and a special line in many things, and in buying of jobbers he cannot do it, as they change so often it is impossible. The jobber buys where he can buy the cheapest and cares nothing for name or brand, except his own, and often the dealer

has made a special point in regard to certain makes of goods, and, running short, he sends his order for the make he has been selling. His jobber is "out just at this time" of those particular goods, but have "sent you something just as good or better." When his goods arrive, to his disgust, he finds the very make he has been competing against. Another very good reason why it is better to buy of the manufacturer is that your goods come to you in better shape—fewer broken packages and no shelf-worn goods. In many lines it is more convenient to the average dealer to buy of the jobber, but the best retail dealers will buy more and more of the maker of the goods, where generally there is no boxing or cartage to pay, and where with allowances for freight he will be able to put the goods in his store for the price that the jobber wants for them.

Red Wing, Minn.—Concerning retail dealers in general, who buy in small quantities only, I concede there is no tendency toward buying direct from manufacturers, as goods can be bought just as cheap from jobbers.

Detroit, Mich.—We have observed the Straub table in *The Iron Age*, but have never kept any statistics of the kind. Owing to the fact that in our specialties we carry a larger variety than the jobbers, it has always been necessary for us to buy of the manufacturers of these lines, which include Tools and Builders' Hardware. Our trade with the jobber is therefore comparatively small. In this city we find jobbers a very great convenience, however, as we can buy staple goods of them to advantage—the small difference in cost being made up by our not having to carry so large a stock.

Waterville, N. Y.—We have read the table of Messrs. Straub & Co. with much interest. We are buying more goods of the manufacturers than formerly, and, as a general thing, find it much more satisfactory than buying through the jobbers. We can usually get better prices and the goods come in much better shape—that is, better packed, less broken and soiled packages, &c. We were largely influenced to buy direct of manufacturers to protect ourselves against the jobbers, as they show great energy in drumming up the consumers' trade in this section, so we are forced to put ourselves in a position to meet them as competitors.

Greenville, Mich.—Think that we buy fully as large a per cent. of our goods of manufacturers as Messrs. Straub & Co.'s table shows, but mostly of Eastern manufacturers. We buy but little West. Think the matter stands almost like this: The manufacturers pick out the best retail trade and drum them and offer them inducements to buy, taking into consideration the prompt paying qualities, more than the size of the sale or the magnitude of the firm's business. And among prompt paying firms we think purchases will reach nearly 75 per cent., while among the smaller firms nearly 75 per cent. is bought of jobbers. That is the way it looks to us.

Bath, N. Y.—We have always preferred to buy of jobbers for the reason that we can buy in such quantities as our wants require at prices a little above the manufacturer, and if we get quantity prices of manufacturer we would feel obliged to buy in larger quantities, and the result would be an overstock of goods and unpaid bills.

Trade Topics.

A factious correspondent, signing himself "Traveler," writes us as follows:

Pardon me for writing such a cranky letter, but really I can hold myself no longer. I am not a stove founder, consequently have nothing to lose as such, but may lose my position on the road on account of my employers closing up shop if the cause of my trouble continues. You ask what it is. Simply this: the manufacturers are being driven crazy by a new fake (similar to the Bohemian Oats swindle) now practiced by the retail dealers all over the country. It is not a new trick by any means, but is being played this year for all it is worth, and plenty of the too over-anxious are always ready to bite.

"For my own use" is the trick. "O, Heavens, it is vile." The retailer writes in asking for a price on a certain stove in your catalogue saying it is for his own use and wants you to make it as low as possible. Of course it is hard to refuse a good customer an extra discount of some kind, and if you allow it once you will be surprised to find how many stoves your customers need for their own use. We have had so many letters of that kind in the past few days that I hardly think it safe for any

man living, Sullivan included, to enter our office in search of a stove or even a fire-back for his own use.

The manufacturer who sells a stove giving an extra ten "for my own use" is more to blame than the man who asks it, as it is the second law of nature (first with some) to buy everything as cheap as possible. I hope the manufacturers will break up this

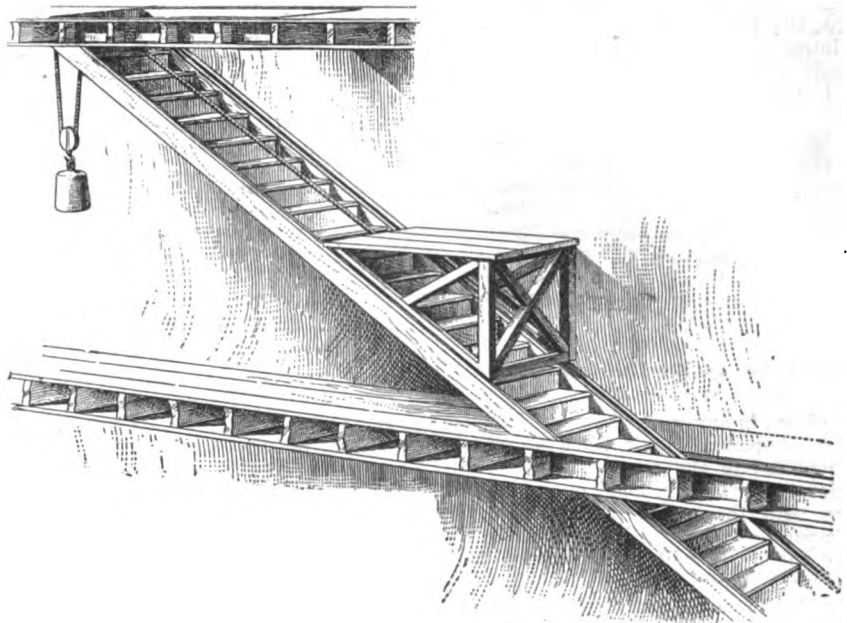


Fig. 285.—Combined Stair and Elevator.

paralyzing practice and tell the festive retailer not to use so many stoves. It is expensive for coal, you know.

Arrangement of Stores.

From P. M. Church & Co., Sault de Ste. Marie, Mich., a description of whose new store we gave some time ago, we have received information in regard to their Combined Stair and Elevator, the construction of which is illustrated in Fig. 285. It is referred to as a convenient method of arranging an elevator where room is an important factor. The car, it will be observed, runs on rails placed at the side of the stairway, a counter weight balancing the platform. The power can be either a set of pulleys or a winch or crab placed up stairs so that a rope can be

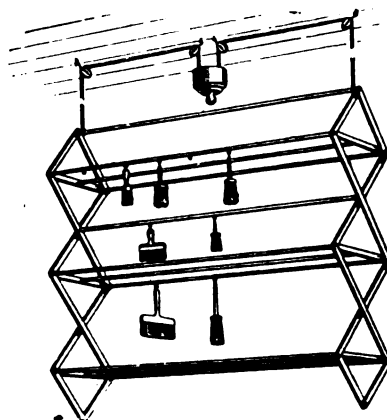


Fig. 286.—Brush Rack.

attached to it. The size of the car deck best adapted for Hardware stores is probably about 4 x 5 feet, but on stairs not having a pitch of more than 30° the car may be lengthened to 7 or 9 feet, and we are advised that it will then work quite as well as far as its equilibrium is concerned. The pitch of the stairs, however, should not exceed 45°. The less pitch there is, the easier, of course, will be the operation

of the elevator. Any number of stories may be reached by this device, but it is intended to extend from the basement to the second floor. The rails are of iron and flat, planted on the stair strings. The first or inner part of the rail is $\frac{1}{4}$ inch wide by $\frac{1}{2}$ inch thick, screwed on the top of the inside of the string or carriage, and the second part is 1 inch square and screwed

on the outer top, forming a rebate on the top, in which the rollers are thus guided. This detail of the construction is illustrated, it will be observed, in Fig. 723. This arrangement is referred to as convenient and satisfactory in its working, and we are advised that a load can be lifted much more easily on this inclined plane than where the lift is direct.

From the same parties we have a description of the Brush rack shown in Fig. 286. This rack is made by cutting down a clothes-horse, using only the principal portion and suspending it with cords, pulleys and counterweights from the ceiling. For attaching samples small screw eyes are inserted in the rack, the eyes being twisted a little to one side so as to form a hook, curved so that anything can be taken off only by lifting and twisting slightly, like a whiffletree hook. When the rack is thus prepared samples of Brushes are taken and small screw eyes placed in the ends. Each Brush is marked with cost and selling price per dozen, as well as a number corresponding to the number of the box in which the stock is kept. In operation a customer calls for a Brush. The rack is pulled down to the proper level for his inspection, thus permitting him to see at a glance what he wants, examine the article and give that critical inspection so pleasant to the average buyer. The salesman knows the box number and can without trouble hand him a Brush clean and fresh from the stock. The advantages of handling Brushes in this way are referred to as obvious, and among them may be mentioned the saving of clerks' time, the elegant and effective display, saving general stock from constant handling, resulting in damage to the goods, and the ease with which samples are disposed of when the sale is completed. As a counter weight a shot bag is used, which can be loaded more or less heavily as samples increase or diminish.

A new and convenient case for the accommodation of Tacks, Nails and other goods is illustrated in Figs 287 and 288. It is the invention of W. G. Barnes, of Larabee & Barnes, Amsterdam, N. Y.

and was patented in July of the present year. Fig. 287 gives a general view of the case, while Fig. 288 shows the construction of the separate boxes which are used in it. This case is designed to furnish means whereby Tacks, Nails, Wire Brads, Staples and similar articles may be more readily handled than by the methods usually employed by Hardware dealers. The size of case as shown is as follows: Length, 35½ inches; depth, 13 inches; height, 19½ inches. The boxes, Fig. 288, are intended to be made of metal and will contain about 25 pounds. When to be filled they may be drawn out of the case



Fig. 287.—Case for Tacks, Brads, &c.

and placed in any convenient position, and the article poured into it, when the bin can be replaced in the case. The goods can obviously be taken in small or large quantities with the use of a small rake, the scale-pan being held under the bin to receive them. It will be understood that the case as shown, Fig. 287, contains two rows of receptacles, each of which is closed by a cover, which is operated as shown. In this case the upper tier is devoted to Tacks and the lower to Wire Brads, the name WIRE BRADS being visible when the lid is closed. The numbers on the under side of the covers denote the size or quality of the articles contained in the boxes under them, and may also have the cost and selling price thereon. This case is alluded to as especially adapted for the handling of Tacks in bulk, Wire Brads,

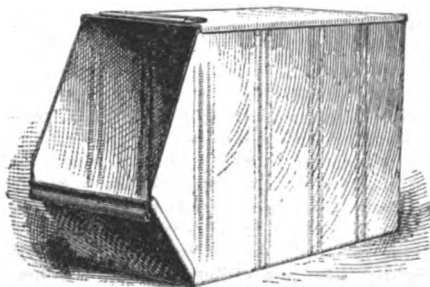


Fig. 288.—View of Box.

Horse Nails, &c., and is offered as a convenient device for this purpose. It is referred to as working exceedingly well in practice and obviating the difficulties that are usually found in managing the line of goods for which they are especially designed.

Condition of Business.

From Louisville, Ky., we have the following report under date October 27:

The Hardware trade of Louisville, Ky., for the past week has been a great improvement over the previous one. General orders are large and entirely satisfactory; this is particularly the case with shelf goods, on which the jobbers realize reasonable profits. Gunning season having arrived, Ammunition naturally forms a large part of country orders.

Shipments this week are very heavy, with many specifications left unfilled for lack of capacity to get them off. The increased demand appears to be general and betokens permanent improvement. The urgent demand for Light Sheet Iron has been relieved by the mills catching up with orders. Bar is freely offering from mills, but prices remain firm so far.

Cut Nails have again gone all to pieces; trade in them being completely demoralized by continued cuts offering and further helped downward by several speculative lots selling at ruinous prices. Overproduction is recognized as

the prime cause of the evil, but then the demand from the country has been small this fall.

Stove jobbers and foundries are having good business, the increased amount of goods going out about equaling lower scale of prices formerly prevailing.

From Fremont, Neb., we have the following advices in regard to the condition of trade and the outlook:

Small grain was not as good here as it usually is. Hence collections have been a little slow. The corn crop is good, well matured and acreage large. Collections should come in well later on. Trade is good, and I look for it to continue so until winter sets in and puts a stop to building. In short, our country here seems to be in a good and prosperous condition.

From Michigan we have the following advices in regard to trade:

While the volume of business is somewhat late in coming forward, trade on the whole is in a healthy condition. Customers, while supplying their needs, are cautious in incurring obligations, and there is a growing disposition to pay cash. Indications are good for future trade.

Recent Exports in Hardware and Related Lines.

PER BARK MYVANROY, OCTOBER 1, FOR PORT NATAL, AFRICA.

By H. W. Peabody & Co.—8 cases Sewing Machines, 31 packages Hardware, 20 packages Agricultural Implements, 50 dozen Shovels, 480 dozen Handles, 165 bundles Sash Weights, 223 packages Agricultural Implements, 87 packages Hardware, 1 case Pumps, 4 crates Churns, 8 cases Hardware, 49 packages Carriage-ware, 12 Axes, 2 cases Bolts and Nuts, 2 packages Lawn Mowers, 13 Sewing Machines, 300 pounds Nails, 120 dozen Handles, 1 case Tools.

PER BARK ROSE C., OCTOBER 9, FOR PORT NATAL, AFRICA.

By New Home Sewing Machine Company.—34 cases Sewing Machines
By Marcial & Co.—10 cases Rims, Spokes, &c., 828 pounds Nails, 2226 pounds Mule Shoes, 3498 pounds Nails.
By J. Norton & Son.—48 Plows.
By W. H. Crossman & Bro.—39 cases Plow Parts, 15 dozen Axes, 57 cases Plow Parts, 29 dozen Axes, 100 dozen Shovels.
By Arkell & Douglas.—360 Hammers, 10 dozen Axes, 16 dozen Picks, 20 dozen Handles.
By H. W. Peabody & Co.—6 dozen Handles.
By Corner Bros. & Co.—54 cases Hardware, 8 cases Agricultural Implements, 177 cases Hardware.
By Coombs, Crosby & Eddy.—22,453 pounds Coil Wire, 6 Corn Shellers, 31 dozen Plow Parts, 78 Clocks, 5 dozen Plow Parts, 176 Plows, 6 Corn Shellers, 356 dozen Handles, 1 dozen Washing Machines, 2 dozen Carpenters' Tools, 3 Corn Shellers, 20 Meat Cutters, 2 Sausage Stuffers, 6 Churns, 1 dozen Wheelbarrows, 8 dozen Wrenches, 18 Lamps, 4 dozen Axes, 27 Pumps, 19 dozen Hardware, 5 Corn Shellers, 6 Churns, 2 Sausage Stuffers, 14 dozen Wrenches, 9 Lamps, 9 dozen Axes, 1 dozen Wheelbarrows, 16 Pumps, 21 Saws, 12 dozen Hardware.

PER BARK WM. PHILLIPS, OCTOBER 11, FOR WELLINGTON, NEW ZEALAND.

By Mailler & Ducreau.—60 dozen Shovels, 300 dozen Handles, 25 cases Sewing Machines, 100 dozen Handles, 20 dozen Handles, 4 cases Saws, 2 cases Saws.
By Arkell & Douglas.—3 cases Carriage-ware, 30 pairs Rims, 2 gross Stove Polish, 5 dozen Saws, 5 dozen Hammers, 5½ dozen Wrenches, 60 pounds Hardware, 4 dozen Axes, 21 dozen Wire Goods, 4 dozen Fruit Presses, 1 dozen Lampware, 2 dozen Lampware.
By A. Field & Co.—11 Stoves, 6 dozen Stove Repairs, 1 gross Blades, 3¼ dozen Hardware, 7 sets Axes, 9 pairs Springs, 1½ dozen Tool Chests, 240 pounds Horse Nails, 3000 Bolts, 10 pairs Hardware, 1 dozen Razor Strops, 6 gross Hooks, 4 dozen Fire Sets, 4 dozen Bird Founts, 3 gross Molds, 2 dozen Tools, 3 dozen Can Openers.
By A. S. Lascelles & Co.—1 case Handles.
By H. W. Peabody & Co.—44,800 pounds Barb Wire, 5 cases Harness and Parts, 5 packages Pumps, 50 cases Hardware, 25½ pounds Castings.
By R. W. Forbes & Son.—15 packages Hardware, 12 dozen Axes, 4 packages Churns, 1 case Toys, 172 dozen Handled Axes, 21 sets Axes, 3 dozen Wringers, 14 dozen Forks, 18 dozen Spade Handles, 63 dozen Handled Axes, 200 papers Lining Nails, 14 dozen Wringers, 3 packages Carriage Hardware, 7 packages Hardware, ¼ dozen Wheel Jacks, 355 pounds Tire Bolts, 9 Lawn Mowers, ¼ gross Rat Traps, 6 dozen Hammers, 1 case

Stamped-ware, 1 case Kitchen-ware, 17 packages Hardware, 8 dozen Hammers, 5 gross Blacking, 5 gross Fruit Jars, 1 case Hardware, 15 dozen Spade Handles, 48 packages Carriage Woodwork, 9 packages Agricultural Implements.

By Coombs, Crosby & Eddy.—6 dozen Shovels, 2 cases Slates, 1 Lathe, 137 pounds Oil Stone, 6 dozen Traps, 6000 feet Safety Fuse.
By W. H. Crossman & Bro.—5 cases Carpenters' Tools, 1 case Mower Parts, 3 Drilling Machines, 1 Washer, 124 pounds Rubber Springs, 40 dozen Handles, 2 cases Pumps, 6 dozen Mouse Traps, 3 dozen Dashers, 872 pounds Nails, 6 gross Wicks, 3 dozen Grindstone Fittings, 255 pounds Tacks, 12 dozen Scythe Stones, 1½ dozen Wringers, 3360 pounds Axle Grease, 13 Stoves, 550 pounds Horse Nails, 1250 pounds Horse Nails, 3 Blowers, ¼ dozen Mangles, 287 pounds Rivets, 2 dozen Bush Hooks, 3 dozen Grindstone Fittings, 2 cases Harness, 25 dozen Axes, 15 cases Hardware, 3 cases Hardware, 7 cases Hardware, 6 cases Carriage-ware, 1 case Tire Benders, 2 barrels Pipe Fittings, 1 case Hardware.

By Woodhouse & Stertz.—2584 pounds Axes.
By New Haven Clock Company.—84 boxes Clocks.

By F. B. Wheeler & Co.—18 sets Wheels.
By Welch & Lea.—4 cases Iron Bolts.
By Plumb, Burdick & Barnard.—1370 pounds Iron Bolts.

By Meriden Britannia Company.—6 packages Plated-ware.

By Singer Mfg. Company.—555 cases Sewing Machines.

By Joseph Dixon Crucible Company.—92 pounds Lead Pencils.

By Russell & Erwin Mfg. Company.—9 cases Hardware.

By W. & B. Douglas.—3 packages Pumps.

By Ansonia Clock Company.—46 boxes Clocks.

By Goulds Mfg. Company.—1330 pounds Pumps.

PER SHIP JOAQUIN, OCTOBER 13, 1888, FOR SYDNEY, N. S. W.

By J. L. Mott Iron Works.—46,202 pounds Cast Iron Stoves.

By W. K. Freeman.—3162 pounds Tackle Blocks, 24 bundles Lamp Goods, 75 dozen Edge Tools, 7 packages Hardware, 2 cases Saws, 165 pounds Drills, 12,557 pounds Axes, 22 crates Churns.

By F. B. Wheeler & Co.—216 dozen Handles, 4 dozen Axes, 6 cases Boys' Wagons, 51 packages Clocks, 67 sets Harness.

By Collins Company.—256 dozen Edge Tools, 80 dozen Picks, 100 dozen Edge Tools.

By Winchester Repeating Arms Company.—250 Guns, 85 sets Tools, 50,000 Metallic Cartridges, 10,000 Metallic Cartridges, 300,000 Primers, 24,000 Metallic Cartridges, 3000 Shells, 25 Guns, 7000 Metallic Cartridges.

By H. W. Peabody & Co.—15 cases Typewriters, 44,810 pounds Fence Wire.

By Seth Thomas Clock Company.—4492 Clocks.

By C. E. Renshaw.—21,343 pounds Axle Grease.

By Ansonia Clock Company.—25 boxes Clocks, 115 boxes Clocks.

New Haven Clock Company.—28 pounds Clocks.

By E. W. Harrison.—2 cases Steel Tools.

By Russell & Erwin Mfg. Company.—15 cases Hardware.

By John A. Ten Eyck.—4 cases Carriage Springs.

By Barber & Co.—915 pounds Iron Castings.

By A. Field & Co.—5 gross Hammers.

By Simpson, Hall, Miller & Co.—210 pounds Plated-ware.

By Fairbanks & Co.—2289 pounds Scales.

By W. & B. Douglas.—11 packages Pumps.

By Rogers, Smith & Co.—1 box Plated-ware.

By Healy & Earl.—5 cases Grain Mills, 1 Hay Press, 13 cases Wood-Working Machinery, 5 boxes Emery Wheels, 1 box Pumps, 2 boxes Saws.

By Meriden Britannia Company.—20 boxes Plated-ware.

By Arnold, Cheney & Co.—1 case Wheels, 11 cases Carriage Hardware, 18 cases Wheels, 4 cases Carriage Springs, 52 cases Axes, 7 cases Wagons, 8 cases Carriage Hardware, 37 cases Axes, 8 cases Saw Mills, 7 cases Hoes, &c., 17 cases Handles, 9 cases Iron Castings.

By Ilsey, Doubleday & Co.—6 gross Egg Beaters, 10 gross Can Openers, 1½ dozen Banks, 1 case Toys, 9 cases Castings, 18½ gross Axle Grease, 6 dozen Step-Ladders, 41 Stencils, 448 pounds Pumice Stone, 4 dozen Paint Brushes, 130 pounds Glue, 2½ gross Axle Grease.

By R. W. Forbes & Son.—32,149 pieces Roofing Slate, 13 boxes Sewing Machines, 50 sets Harness, 1 Carriage, 2 cases Carriage Hardware, 6 packages Machinery, 1 box Plated-ware, 1 case Toys, 2 cases Hardware, 22 packages Agricultural Implements, 11 packages Corn Shellers, 14 packages Machinery, 7 packages Guns and Parts.

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By R. W. Forbes & Son.—32,149 pieces Roofing Slate, 13 boxes Sewing Machines, 50 sets Harness, 1 Carriage, 2 cases Carriage

By A. S. Lascelles & Co.—6 gross Axle Grease, 6 cases Tacks, 50 dozen Washboards, 1 case Toys, 3 cases Toys, 12 gross Pencils, 57 cases Slates, 2 gross Mouse Traps, 2 cases Firearms, 1 gross Wrenches, 2½ gross Saws, 3 dozen Money Drawers, 100,000 Primers, 2000 Cartridges, 1½ gross Padlocks, 1 case Blocks, 6 dozen Scissors, 1 case Firearms, ½ dozen Cork Pullers, 3 boxes Brackets.

Science vs. Familiar Things.

BY KNARF.

What is more familiar to us than stoves, and yet how unfamiliar are the most familiar things. For instance, the writer remembers, in his boyhood days, the kitchen stove, and that a large iron pot always stood on the left-hand back griddle hole, with water in; so there could have been no reservoir to the stove. The construction was not of the elevated oven type, nor of the crank stove, where the lids were revolved at pleasure over the fire, by the aid of a crank and cog-wheel working in corresponding cogs on the underside of the top of the stove, which was necessarily circular. My memory of this stove was contemporary with about 1858 or '59. We had a "Dutch oven" built in connection with the chimney, with the feed door, also the oven door, built to open into the kitchen. This oven I never saw used, and why it was built I never knew. The house was built about 1852, and that must certainly have been after people were dependent upon a tin reflecting oven, before an open fireplace. I know some of our neighbors' houses had the same "Dutch oven" arrangement in them. The "Dutch oven" of that day, was similar to the bakers' oven of the present time. This, with an open fireplace for wood, took nearly all the space on one side of a large kitchen, as it was one continuous brick front, the oven flue merging into the fireplace flue before it reached the top of the chimney. But to return to the stove; though I can see that stove standing in our kitchen, black, with no attempt at ornamentation or nickel; and, though it burned wood—and a good deal of it—I cannot tell the make, nor number, nor date of patent.

I was not far enough along in stoveology to be interested in these matters. I know about this time my father tired of changing this stove from the kitchen to the woodshed, in summer, and from the woodshed to the kitchen again in the fall. I surmise, too, that the stove was getting the worse for wear; so it was not brought back into the kitchen one fall, but a new one took its place. I think my mother preferred the old stove to cook in. And so I was in the same house for years with this cook stove. I can tell nothing in particular about it.

What science does the average husband try harder to learn than that of putting up stoves? Each fall presents the same question, and each time he tackles the problem fearlessly, and it usually results in a stove man being called. The same pipe was used last year, when the stove stood just where you want it again this year; this pipe has shrunk and won't fill the bill, though it was all put away together in the spring and hasn't been touched since until you try to put it together and make it reach. Then, too, after you have tried to put all the big ends of the pipe together, and then all the small ends together, you feel so mean, and yet somewhat relieved, to see how easily the pipe fits together, and stretches the required length in the skillful hands of a tinner.

The same question comes up in the household each fall: How are we going to arrange for heating this winter? The self-feed base-heater is not suitable for early fall or late spring, and it is such a nuisance to burn wood for a while and then have to change to a coal stove. Four stoves are necessary for the safe conduct of a family through each year. A gasoline stove

for cooking in summer and a cook stove for winter. A wood heating stove for fall and spring and a coal stove for winter. Those who have furnace, grate and gas stove are not troubled as other men are.

The stove question is a troublesome one to any family in moderate circumstances, whether it be the getting of a cook stove or a heater. After the question that there has to be a new stove, by the inability of the old one longer to fill the requirements of the family, the next question is, "What kind?" The neighbors' stoves are brought up for comparison, and the beauty and utility of Mrs. Smith's is compared with that of Mrs. Jones's. The wife takes occasion next day to "look around" among the stove stores, and after being shown the assortment in three or four of them, becomes so bewildered in styles and prices, and where she saw this one, or that one, she can't tell. The daughter takes a look, and comes home with her mind made up as to just the one she would buy. Some evening, a few days later, the old gentleman takes the matter in hand, and is going to have an end of this foolishness. Before he reaches home he has ordered a stove, which proves to be just the one his wife and daughter "would not have under any consideration" when they were looking. The rumpus ensuing is a stayer; in fact, it causes unpleasantness in the family until it is worn out. The science displayed by the salesman in working off the old familiar thing on the husband—the stove that has been on his floor for more than a year—is a standing joke in the store for a long time.

A most unpleasant feature of the stove trade over a large section of our beautiful country is the prominent part "second-hand stoves" play in closing a bargain for a new stove. Horse trading is not to be compared to it. Broken down, foundered, spavined stoves are brought to view, just as good as the day they bought them, splendid heaters or cooks, as the case may be, and the only reason they want to trade is because it is too large or too small, too high to put coal in, or it takes up too much room in the kitchen. But trade we have to, or some one else will, and make the sale of the new stove. And so the merchant's profits on his new stove, or, perhaps, more than the profits, go in the second-hand store. A lease is generally taken for the balance of the payment, the money to be paid in installments, making the final payment due in about six months. Oh! the familiar things are pleasant to deal in. Sometimes we think there is a tendency toward less nickel in buyers' minds, and yet, however strongly they object to a fancy stove, the appointments of this class of goods are usually so much better than the plainer that they choose the nickeled ones. The fall trade on heaters bids to be light, especially in hard-coal base-burners. The high-priced coal is almost prohibitory for the \$1.25 or \$1.50 a day laborer; \$7.50 and \$8 coal is beyond their reach. Wood they can buy by the load as their needs be without feeling it so much. Wood stoves of small size and little money are in demand, just to use until coal comes down, which each winter they hope it will do, before the next season. How little idea we have of the grinding poverty of the day laborer, the man that depends upon muscle instead of brain for a livelihood. Accident or sickness incurs a debt that takes months to pay, and many waste the best years of their lives in trying to make both ends meet. Yet this class of people are the real consumers, the ones the country depends upon to use its products. There is a growing demand among the thinking class for burners that will successfully use oil for fuel, both for cooking and heating. A number of this class of inventions have been put upon the market, but have not filled the place.

Some are too expensive or complicated; they are not economical in fuel; they clog up or have to be run in connection with a steam jet. The matter is interesting many minds, and before long some one will make a fortune who gets the right thing for this purpose.

The fact of smaller bills of stoves on first orders, and a more frequent ordering as stocks or assortments become broken, seems to be the order of the day. While stove men try to look at it in a favorable light, it is an open secret they are disappointed. There seems to have been a hope of an increase over last year's business, which, so far, has not been realized. While we hear of large crops through the press, there are few sections West, North or South that are not short on some staple. Where there is abundance of everything, old debts are making the farmers feel poor. There is, no doubt, a change taking place in the manner of doing business, which is wholly the outcome of the necessity of the times. One favorable feature in this perceptible change is a gradual nearing to cash. The stove manufacturers, with large profits, years ago could afford to give long time. The merchant on this long time could afford to sell stoves on leases or monthly payments, until now a cash customer for a stove is a rarity. The stove makers have talked the matter of shortening the time on stoves, but in some way do not see their way clear to do it. A shortening of time from first hands would necessitate a corresponding curtailing of liberality on the part of the retailer, which, no doubt, would reduce the number of stoves retailed. The laboring class who break up stoves in moving and buy new ones, or another class who are higher in the dollars and cents and trade off a good stove for one of newer style, are not able to pay cash for a stove.

What the reduction in stove sales would be if every one kept their stove as long as it was serviceable, instead of trading it off simply on account of style, will probably never be determined. There is no doubt but the change in patterns of stoves, especially heating stoves, during the last three or four years, has acted like a tonic to the retail trade. To keep up with the styles of stoves, and have one as good and elaborate as the neighbor, has stimulated the trade, and now, like a sick person, the trade has had a relapse because the tonic is no longer taken, or, if taken, is losing its effect. It is not an unusual thing in some sections of the country to see from 20 to 100 second-handed heaters in stock. Each of these second-hand stoves represents at least the profit of the new stove which took its place, if not more than the profit. A large part of these stoves have been carried over from last year; they had to be put away for the summer, brought out again this fall, polished again, and in many cases will be sold for less than cost to close them out. Is it any wonder that retailers are not placing large orders? The query is pertinent, Why do you trade in second-hand stoves? Because if you do not offer the same inducements as your competitors you will be badly left. They will do such business, and you must. Second-hand cook stoves are generally in demand, being fewer of them on the market. A cook stove is good until it is worn out, as styles change less, and even with more nickel on and swell doors, kickers and pie-removers, the old cook stove remains in the kitchen, and is not intended for show. A cook stove that is a "good baker" is so highly prized it is used until the last minute. So, while the cook stove is an old familiar thing, the heater is unfamiliar. New ornaments, jewels, nickel, new shapes and styles are found in our houses each year, and the Morning Glory, Good Record, Shining Light, and many other contemporaries are consigned to the scrap pile.

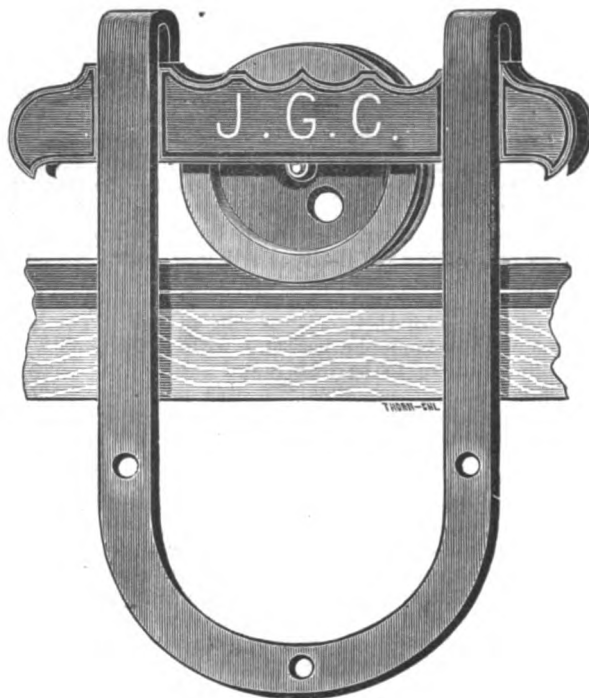
The J. G. C. Hanger.

This hanger is made by the Coleman Hardware Company, Chicago and Morris, Ill. The frame is described as made of Bessemer steel bent from flat bars while hot. The rider bars are malleable iron with ribbed recesses for frames. The claim is made that the hanger is thoroughly braced, so as to be equal to solid

by the various ranges to date: Marquette range, 1,543,447 tons; Gogebic, 1,100,451 tons; Menominee, 926,190 tons; Vermilion, 368,385 tons; total, 3,938,473 tons.

Thompson's Clean Box Shoe Blacking.

The accompanying illustration represents a new style of blacking box which is used by the Thompson Mfg. Company, Lansing-



The J. G. C. Hanger.

forgings. It is put on the market to meet the demand for a hanger that can be sold in competition with cheap goods. It is made in three sizes, No. 0, No. 1 and No. 2, for 20 feet, 12 feet and 7 feet doors respectively.

Combined Drill Holder and Countersink.

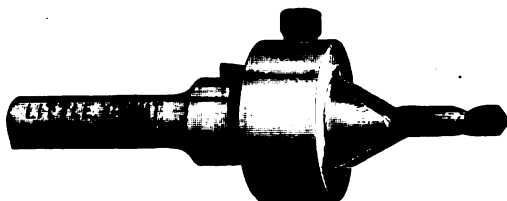
Wells Bros. & Co., Greenfield, Mass., have recently put on the market the Little Giant Combined Drill Holder and Countersink represented in the accompanying illustration. It is intended for use with regular twist drills, and the point is made that, the countersink following the drill, the job is completed at one operation. The drill, it will be observed, may be set for the depth of hole wanted. It is so constructed that the countersink cutters can be taken out and ground. The hole

burgh, N. Y. In the cut the box is represented open with the lid resting upon it. In the form in which the box is made, it will be seen that it can be readily held in the hand while the fingers are protected from contact with the brush or blacking by the wide and flaring edge. The manu-



A New Blacking Box.

facturers also call attention to the fact that the box has rounding corners, thus permitting the removal of all blacking by the brush, as there are no sharp corners in



Combined Drill Holder and Countersink.

runs through the holder. This tool is made with $\frac{1}{4}$ -inch or $\frac{1}{2}$ -inch shanks, the $\frac{1}{4}$ -inch being furnished unless otherwise ordered. This tool is made for holding $\frac{1}{8}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ inch drills. It is described as made of the best tool steel.

A Marquette, Mich., dispatch to the Cleveland Plaindealer, dated October 27, gives the following totals of ore shipments

which the blacking hardens out of reach. The point is also made that from the construction of the lid the box is easily opened without the annoyance that is often experienced from tight covers. The quality of the blacking is also alluded to. The simplicity, neatness, convenience and cleanliness of the box, together with the fact that it costs no more than the common flat box, are other points made in regard to it.

Royal Flint Ware.

George Havell, Newark, N. J., for whom Hibbard, Spencer, Bartlett & Co., Chicago, Ill., are agents, is manufacturer of a line of Royal Flint Ware, including a variety of culinary utensils, some of which are represented in the accompanying illustrations, from which a correct idea may be obtained of the style and special features of the goods. The ware is made of solid crockery, with metal bands for the purpose of attaching the necessary handles. The bottom of each utensil is protected with sheet iron, to which it is attached by means of a bead and groove in the earthen-



Fig. 1.—Oxford Sauce Pan.

ware, into which it is turned. There is an air space between the iron and the bottom of the vessel to prevent burning. Fig. 1 represents the Oxford saucepan, which is made in 1 $\frac{1}{4}$, 2, 2 $\frac{1}{2}$, 3 $\frac{1}{4}$, 4 $\frac{1}{4}$, 5 $\frac{1}{4}$ quarts. Fig. 2, the Venice teapot, which is made in 1, 1 $\frac{1}{2}$, 2, 3, 4 and 6 quarts, and Fig. 3, the Dresden Kettle, which is made in 1, 2, 3 and 5 quarts. The bright metal bands by which the handles are attached contrasting



Fig. 2.—Venice Tea Pot.

pleasantly with the color of the body of the utensils gives them an attractive appearance. The material of which these utensils are made is referred to as a composition possessing absolutely fire-proof qualities, and as only the china comes in contact with the food the desirability of these goods for culinary purposes is alluded to, while they are referred to as commended by their cleanliness, durability

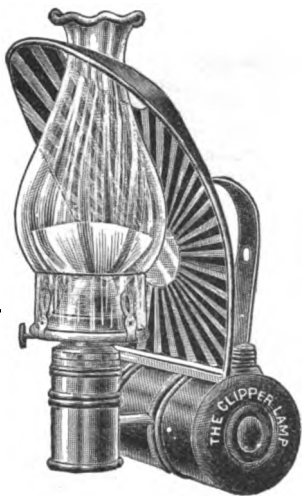


Fig. 3.—Dresden Kettle.

and attractiveness. It is expected that they will fill a place in the kitchen in competition with ordinary agate and granite ware for many purposes. Besides the articles illustrated Mr. Havell's circulars represent the Venice coffee pots, 1, 1 $\frac{1}{4}$, 2, 3, 4 and 6 quarts; Royal pie plates, two sizes; Dresden saucepans, 1, 3 and 5 quarts; Royal pudding pans, 2, 3, 4 and 6 quarts; water coolers, 2, 3 and 6 gallons; Oxford preserving kettles, 1 $\frac{1}{4}$, 2, 2 $\frac{1}{4}$, 3 $\frac{1}{4}$, 4 $\frac{1}{4}$ and 5 $\frac{1}{4}$ quarts; White House pails, 1, 2, 3 and 4 quarts, and White House jars or kettles, 1, 2, 3 and 4 quarts.

Clipper Lamp and Reflector.

The Clipper Mfg. Company, of Cincinnati, Ohio, are offering the trade the Clipper safety lamp, provided with their new style corrugated reflector, a general view



The Clipper Lamp.—Fig. 1.—Lamp Showing One Style of Corrugated Reflector.

of which is afforded by the engraving Fig. 1. This lamp is specially designed for using coal oil as an illuminant and for employment in the kitchen, shop, store or factory. It is claimed to be perfectly safe and to give double the light of an ordinary household lamp. It is constructed of very heavy tin plate, which removes all danger of breakage. The special feature to which the company direct attention is the reflector, which is corrugated in such a manner as to greatly add to the power of the light. It is also arranged in such a way as to serve as a guard to the chimney, keeping it perfectly fast in place, while the handle acts as a bracket, by

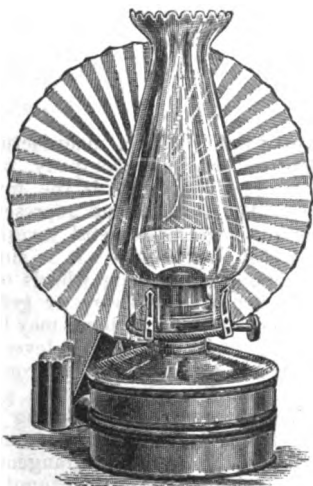


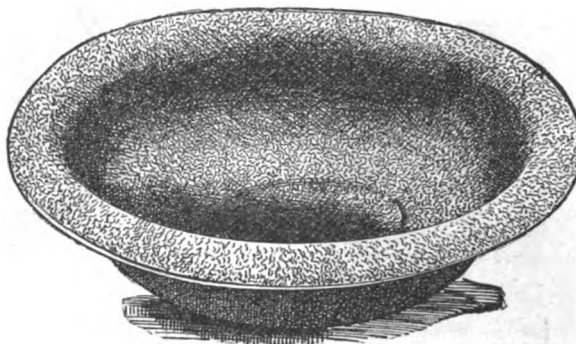
Fig. 2.—The Clipper Queen Anne Lamp.

which the lamp may be suspended upon the wall or carried from place to place. The lamp is easily filled, cannot be broken and will not easily upset. Each lamp is thoroughly tested and is guaranteed not to leak if properly filled. Another form of lamp and reflector is shown in Fig. 2 of the accompanying illustrations. In this case the base or foot of the lamp is made of glass, rendering it free from leakage. The reflector is more nearly circular than the one above referred to and is placed in a slightly different position with regard to the lamp chimney. In the back of the handle is a match box, which will be found a great

convenience. These goods are offered the trade in fancy colors, and are packed one dozen in a case.

Compressed Paper Wash-Basin.

Hibbard, Spencer, Bartlett & Co., of Chicago, agents for Snelling & Matches, Newark, N. J., manufacturers, are putting on the market a line of unique wash-basins composed of paper, which has been compressed in the shape shown in the ac-

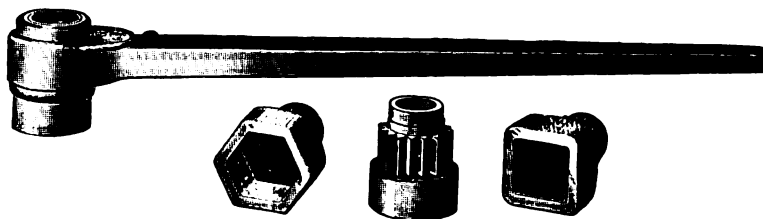


Compressed Paper Wash Basins.

companied illustration. These basins are warranted thoroughly water-proof, will not crack or foul, and are handsomely decorated in six colors. The manufacturers announce that, while they guarantee them to be adapted to any climate, they will be found specially suitable for use in extremely hot countries where tin and other ware soon become useless. These basins are lighter than those made of tin or crockery and are besides more durable, being non-dentable, and non-breakable. Five sizes are made, the smallest being 11½ inches in diameter by 3 inches in height, and the largest 15½ inches in diameter by 4 inches in height.

Steel Socket Bridge Wrench.

The illustration given below represents a new ratchet wrench designed for turning large nuts. It is manufactured by the Lowell Wrench Company, Lowell, Mass. The tool is so constructed that when once placed on the nut it is not necessary to take it off until the nut has been screwed up as far as desired, the turning being accomplished by the simple oscillation of the handle, as in the well-known ratchet drill. By moving the thumb-latch shown on top the same motion of the lever causes the wrench to turn the nut off instead of on. The point is made in regard to this wrench that it is especially compact and durable, and that the space occupied about the nut is comparatively small, allowing the use of the wrench in close places. The wrenches are made in three sizes, including sockets to take nuts from 1½ inches to 4½ inches in diameter, varying by eighths up to 2



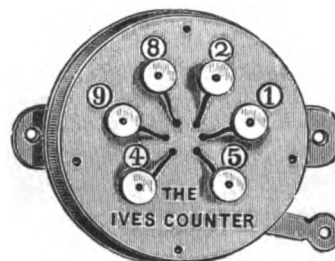
Steel Socket Bridge Wrench.

inches, and then by ¼ inches. The tests to which this wrench has been subjected in practice have convinced the manufacturers that it will be found to meet a want for a tool of this character. The wrenches and sockets are made from steel castings,

and are fully warranted. They are sold in this city by Manning, Maxwell & Moore, 111 Liberty street, New York.

The Ives Counter.

The accompanying illustration represents the Ives Counter, which is put on the market by George E. Ives, New Haven, Conn. It is intended to be attached to a press or other machine for registering its movements so as to give an accurate ac-



The Ives Counter.

count of its productions and showing each operator's progress as often as may be desired. The diameter of the face is 3½ inches, the entire width across face and projections being 4½ inches. The thickness of the entire machine is 1½ inch and the weight 12 ounces. The lever moves ½ inch at the extreme end. The case is of brass, the works being iron and steel, except the faces of the dials which are card-

board secured to brass. The machine may be instantly set at zero or any number desired, by means of a thumb-screw on face. In using the counter it is secured on some stationary part of the machine or near the machine, a wire or chain being attached to the lever, and the opposite end of the wire to the moving part of the machinery when it is ready for use. A single machine is sold at \$4, lots of six at \$3.50, and lots of one hundred or more at \$2.25.

The last quarterly report of the Bureau of Statistics just issued contains, in a tabular form, the rates of import duties

under the several tariff acts from 1789 to 1883, both inclusive, in four groups, from July 4, 1789, to February 5, 1816, from April 27, 1816, to August 30, 1842, from July 30, 1846, to June 21, 1874, and from June 22, 1874, to January 1, 1884.

The Eureka Drum.

We illustrate in the accompanying cuts a combined oven and heating drum, which is the invention of De Witt Van Evra, is manufactured and sold by Kieckhefer, Bartling & Co., 149 Lake street, Chicago. Fig. 1 shows the general appearance of the device with the end door closed. The drum is made with a sheet-iron body and cast-iron heads, oven bottoms, collars and doors. The sheet-iron body can be made of any length, so as to fit a long box stove

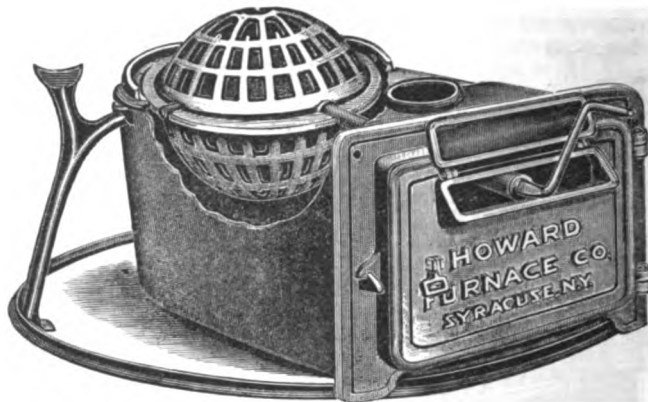


The Eureka Drum.—Fig. 1.—General View of Drum with Door Closed.

or an ordinary heating stove as may be found desirable or necessary. It can be used on the top of a stove to secure additional heat or to convert a heating stove into a cooking stove, or it can be placed in an upper room to heat it by utilizing the waste heat from a cooking or heating stove in the room below. The smoke and

is provided on the inside of the drum, forming a convenient arrangement for heating water, irons, &c. The advantages of the Eureka drum, as stated by the inventor, are as follows: A heating stove can be converted into a parlor cook; a

is a spring which is of sufficient tension to hold the prongs closed. By compressing the spring by means of the small handle shown in the cut at the left of the larger one the prongs are opened, releasing the article held between them. By allow-



The Howard Spherical Grate.

cheap high shelf and warming oven are secured, and a great convenience is provided for heating water, irons, &c., with a surface burner.

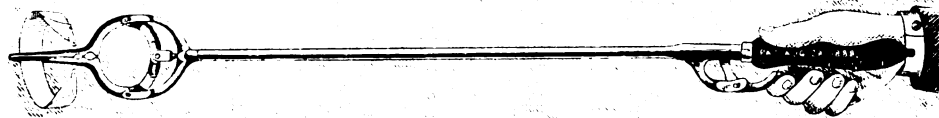
Champion Window Dresser.

The attention which is being given to the appearance of show-windows at the present day is well known to all in the retail trade who have carefully read the columns of *The Iron Age* during the past year or two. It is also a well-recognized fact that, in order to maintain an attractive display in the show-window, it

ing the handles to spring apart the prongs are again closed. The device is claimed to be cheap, durable, and not likely to get out of order. The stiffness of the spring may be regulated by means of a nut inside the handle. The dresser is 3 feet 8 inches in length, nickel-plated and provided with an ebonized handle.

Howard Spherical Grate.

In the engraving presented herewith is shown a general view of what is known as the Howard Patent Spherical Self-Dump-



Champion Window Dresser.

other products of combustion pass completely around the interior of this drum, being guided by deflecting plates which retain the heat but do not obstruct the draft. Fig. 2 of the illustrations shows the jacket of the drum partly cut away to expose the construction of the interior.

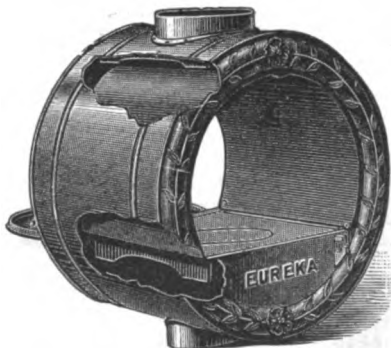


Fig. 2.—View of Drum with Side Partially Broken Away.

The doors are portable; when closed they convert the drum into an oven, but when it is not used as an oven they are intended to be taken off. They are also hung in such a manner as to form shelves when they are dropped down. By reference to Fig. 2 it will be seen that a cooking hole

is necessary to make frequent change in whole or in part of the goods which compose the exhibit. To do this with the greatest convenience is an object sought by all, and devices have been brought out for the purpose of assisting in this direction. Where the windows are high, the upper part of the display contained therein is usually composed of light articles which are placed in position by the assistance of a stepladder. This is, inconvenient and annoying, and in order to obviate the use of such means and provide for a well-defined want in the retail trade, the Anderson & Krum Stationery Company, of this city, have brought out what is known as the George F. Hall Champion Window Dresser, a view of which is presented herewith. It is designed for use in moving light goods from one place to another on a shelf, line or bracket beyond the reach of a person's arm. It is convenient to handle and especially well fitted for dressing and arranging articles in a show-window. By means of the device shown it is claimed that the user can from his position on the floor reach any point in a window, and can handle all articles therein with as much facility as if they were in reach of his arm. The device, as will be seen from the engraving, consists of a pair of prongs, which may be of various forms, operated by means of a rod extending down the hollow shaft to the handle. In the handle

ing Anti-Clinker Grate, manufactured by the Howard Furnace Company, of Syracuse, N. Y. This grate is the invention of Mr. C. D. Howard, and represents the results of years of careful investigation and careful experiment. It is simple in construction, has no cog wheels or other complicated parts to warp or get out of order, and is arranged that it may be operated by a crank or upright lever as may be desired. As will be seen from an inspection of the engraving, the grate is spherical in form, thus presenting a large surface to the fire and therefore more air for combustion. The arrangement of parts is such that the grate cannot be left so as to burn out. Every time it is moved or partially revolved a new surface is presented, at the same time shaking and cleaning the fire perfectly. The parts are all strongly built and the grate is claimed to embody all the good points of other grates at present in use.

The Philadelphia *Record* made an attack on the Bethlehem Iron Company, in which the assertion was made that the company paid \$1,860,000 in dividends in seven years and put \$1,200,000 of earnings into new plant. Joseph Wharton, in a letter to the *Press*, corrects the figures, making the dividends \$1,740,000, and showing that the funds for new plant were raised by a mortgage.

CURRENT HARDWARE PRICES.

OCTOBER 31, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Percussion, 7000—	
Blacks & Goldmark's	
7 L. Waterproof, 1-10's	50¢
8 L. Trimmings, 1-10's	dis 25¢
9 L. Ground Edge, Central Fire, 1-10's	70¢
Double Waterproof, 1-10's	74¢
Musket Waterproof, 1-10's	50¢
G. D.	30¢
A. B.	30¢
Union Metallic Cartridge Co.	
F. C. Trimmings	50¢
F. L. Ground	dis 25¢
Con. Fire Ground	70¢
Double Waterproof	74¢
Double Waterproof, 1-10's	74¢
A. B. Genuine Imported	45¢
Wey's B. B.	54¢
Wey's D. Waterproof, Central Fire	\$1.40

Cartridges—	
Blm Fire Cartridges	dis 50¢ & 52¢
Blm Fire Military	dis 15¢ & 16¢
Central Fire, Pistol and Rifle	dis 25¢ & 26¢
Central Fire, Military & Sporting	dis 15¢ & 16¢
Blank Cartridges, except 22 and 32 cal., an additional 10% over above discounts.	
Blank Cartridges, 22 cal.	\$1.75, dis 2¢
Blank Cartridges, 32 cal.	\$2.50, dis 2¢
Primed Shells and Bullets	dis 15¢ & 16¢
B. B. Caps, Round Ball	\$1.75, dis 2¢
B. B. Caps, Conical Ball, Swaged	\$2.00, dis 2¢
Primers—	
Berdan Primers all sizes, and B. L. Caps for Sturtevant Shells	\$1.00, dis 2¢
All other Primers, all sizes	\$1.20, dis 2¢

Gauges—	
First quality, 4, 8, 10 and 12 gauge, dis 25¢ & 10¢ 2¢	
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30¢ & 10¢ 2¢
Star, Club, Rival and 10 gauge, \$9 list	dis 33¢
Climax Brands, 12 gauge, \$8 list	\$10 2¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢ & 10¢ 2¢
Selbold's Combination Shot Shells	dis 15¢ & 16¢
Brass shot Shells, 1st quality	dis 60¢ & 2¢
Brass shot Shells, Club, Rival, Climax	dis 65¢ & 2¢
A. B. & Co., I. X. L. 10 & 12 gauge	dis 40¢ & 2¢
A. B. & Co., "Special," 16 gauge	dis 30¢ & 10¢ 2¢
A. B. & Co., "Special," 10 & 12 gauge	dis 40¢ & 2¢
Fowler's Patent, 10 & 12 gauge	\$1.00

Shells Loaded—	
List No. 19, 1887	dis 20¢ & 10¢

Wads—	
U. M. C. & W. R. A.—B. B., 11 up	\$2.00
U. M. C. & W. R. A.—B. B., 7 & 8	\$2.50
U. M. C. & W. R. A.—B. B., 7 & 8	\$3.00
U. M. C. & W. R. A.—P. B., 11 up	\$3.10
U. M. C. & W. R. A.—P. B., 7 & 8	\$4.00
U. M. C. & W. R. A.—P. B., 7 & 8	\$4.00
Wey's B. B., 11 up	\$1.75
Wey's P. B., 11 & 20	\$2.50

Anvils—	
Angell's Anvil	\$104, dis 30¢ & 20¢
Peter Wright's	\$140
Armstrong's Moose Hole	\$140
Armstrong's Moose Hole, Extra	\$140
Treadwell's	\$140
Wilkinson's	\$140
J. & Riley Carr, Patent Solid	\$140

Anvil Vices and Drills—	
Cheney Falls Co.	\$15.00, dis 30¢
Cheney Anvil and Vice	dis 35¢
Allen Combined Anvil and Vice	\$2, dis 40¢ & 10¢
Moore & Barnes Mfg. Co.	dis 35¢

Apple Parers.

Advance	\$ dos. \$4.75
Antrim Combination	\$ dos. 5.50
Baldwin	\$ dos. 5.25
Champion	\$ dos. 7.25
Eureka, 1888	each 12.00
Family Bay State	\$ dos. 12.00
Gem	\$ dos. 5.25
Gold Medal	\$ dos. 4.00
Hudson's New '88	\$ dos. 3.75
Ideal	\$ dos. 4.75
Improved Bay State	\$ dos. 30.00
Little Star	\$ dos. 5.00
Monarch	\$ dos. 13.50
New Lightning	\$ dos. 5.50
Orion	\$ dos. 4.00
Penn	\$ dos. 4.00
Perfection	\$ dos. 4.00
Pomona	\$ dos. 6.00
Rocking Table	\$ dos. 6.00
Turntable	\$ dos. 4.50
Victor	\$ dos. 13.50
Waverly	\$ dos. 4.50
White Mountain	\$ dos. 4.50
72	\$ dos. 4.25
75	\$ dos. 5.75
78	\$ dos. 6.50

Augers and Bits.

Douglas Mfg. Co.	
Wm. A. Ives & Co.	dis 70¢
Summersville Mfg. Co.	dis 60¢ & 10¢ & 10¢
French, Swift & Co. (F. H. Beecher)	dis 60¢ & 10¢ & 10¢
New Haven Copper Co.	
Cook's, Douglas Mfg. Co.	dis 60¢ & 10¢ & 10¢
Cook's, New Haven Copper Co.	dis 60¢ & 10¢ & 10¢
Ives' Circular Lip	dis 80¢
Patent Solid Head	dis 80¢
C. E. Jennings & Co., No. 10, extension 1/2"	dis 40¢
C. E. Jennings & Co., No. 30	dis 60¢
C. E. Jennings & Co., Auger Bits, in fancy boxes	dis 20¢
Low's Patent Single Twist	dis 45¢
Small Jennings' Augers and Bits	dis 50¢
Imitation Jennings' Bits (new list)	dis 60¢ & 10¢
Fugh's Black	dis 80¢
Car Bits	dis 50¢ & 10¢ & 10¢
L'Hommedieu Car Bits	dis 15¢ & 10¢
Forstner Pat. Auger Bits	dis 10¢

Yellow Augers—	
Ives	dis 35¢ & 10¢
French, Swift & Co.	dis 35¢ & 10¢
Douglas	dis 40¢ & 10¢
Low's Adjustable	dis 40¢ & 10¢
Stearns	dis 40¢ & 10¢
Ives' Expansive, each \$4.50	dis 20¢
Universal Expansive, each \$4.50	dis 20¢
Wood's	dis 25¢ & 10¢

Companies and Bits.

Clark's small, 1/8", large, 3/8"	dis 25¢ & 35¢
Ives' No. 4, per doz.	\$50
Swan's	dis 40¢
Stearns, No. 1, 3/8", No. 2, 3/8"	dis 35¢
Stearns' No. 3, 3/8"	dis 20¢
Common Bits—	
Diamond	\$ gross \$2.75—dis 25¢
"Bee"	dis 25¢ & 35¢
Double Cut, Shephardson's	dis 45¢ & 55¢
Double Cut, Ot. Valley Mfg. Co.	dis 30¢ & 10¢
Double Cut, Hartwell's, 7/8" gro.	dis 35¢
Double Cut, Douglas's	dis 40¢ & 10¢
Double Cut, Ives's	dis 60¢ & 10¢

Stap Augers and Bits.

Stap Augers and Bits—	
L'Hommedieu's	dis 15¢ & 10¢
Watrous's	dis 15¢ & 10¢
Stearns	dis 15¢ & 10¢
Stearns' Ship Auger Pat. Car Bits	dis 15¢ & 10¢
Awl Hints.	
Sprwing, Brass Ferrule	\$3.50 \$ gross—dis 45¢ & 10¢
Patent Sewing, Short	\$1.00 \$ dos—dis 40¢ & 10¢
Patent Sewing, Long	\$1.30 \$ dos—dis 45¢ & 10¢
Patent Peg, Plain Top	\$1.00 \$ gross—dis 45¢ & 10¢
Patent Peg, Leather Top	\$1.20 \$ gross—dis 45¢ & 10¢

Awls, Brad Sets, &c.

Awls, Sewing, Common	\$ gross \$1.70—dis 35¢
Awls, Shouldered Peg	\$ gross \$2.45—dis 40¢ & 10¢
Awls, Patent Peg	\$ gross 63¢—dis 40¢ & 10¢
Awls, Shouldered Brad	\$2.70 \$ gross—dis 35¢
Awls, Handled Brad	\$7.50 \$ gross—dis 45¢
Awls, Handled Scratch	\$7.50 \$ gross—dis 35¢ & 10¢
Awls, Socket Scratch	\$1.50 \$ dos—dis 35¢ & 10¢

Awls and Tool Sets.

Allen's Sewing & Tools, No. 30	\$40.00—dis 55¢ & 10¢
Pray's Ad. Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	dis 25¢ & 10¢
Miller's Falls Ad. Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	dis 35¢
Henry's Combination Hds.	\$ dos. \$5
Brad Sets, No. 42, 43, 44, 45, 46, 47, 48, 49, 50	dis 70¢ & 10¢
Brad Sets, Stanley's Excelsior, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	dis 70¢ & 10¢
Brad Sets, Stanley's Excelsior, No. 2, 3, 4, 5, 6, 7, 8, 9, 10	dis 70¢ & 10¢
Brad Sets, Stanley's Excelsior, No. 3, 4, 5, 6, 7, 8, 9, 10	dis 70¢ & 10¢

Axes.

Knives and Special Brands—	
First quality	\$ dos. \$3.00—dis 50¢
Others	\$ dos. \$2.50—dis 50¢

Axle Greases.

Fraser's, in bulk	Keg \$ 2.40; Pail, \$ 1.50 net
Fraser's, in boxes	\$ gross \$0.50
Dixon's Everlasting, in bxs., \$ dos. 1 1/2	\$1.20; 2 1/2
Dixon's Everlasting, 10-lb pails, each	\$5
Lower grades, special brands	\$ gross \$5.50—dis 50¢
Axles, No. 1, 1/4" & 3/4" No. 2, 5/8" & 3/4"	\$ dos. \$5.50
No. 10 to 25	dis 60¢ & 10¢ & 10¢
National Wrought Steel Tubular Self-Oiling	dis 60¢ & 10¢ & 10¢
Standard Farm (1 to 5) and Special Farm (A1 to A5)	dis 35¢
Less than 10 sets	dis 35¢
Over 10 sets	dis 35¢
X Strong Exp. (6 to 9), and XX Strong Truck (10 to 14)	dis 40¢
Less than 10 sets	dis 40¢
Over 10 sets	dis 40¢

Bag Holders.

Spencer's Pat.	\$ dos. \$15
Maloney's—Spring Balances	dis 50¢
Common \$4	\$ dos. \$1.50—dis 50¢
Chattillon's Spring Balances	dis 50¢
Chattillon's Circular Spring Balances	dis 60¢

Beils.

Beils—	
Light Brass	dis 70¢ & 10¢
Extra Heavy	dis 60¢ & 10¢
White Metal	dis 60¢ & 10¢
Silver Chrome	dis 35¢ & 10¢
Globe (Coke's Patent)	dis 35¢ & 10¢

Bars.

Song, Abbe's	dis 35¢ & 10¢
Song, Yankee	dis 40¢ & 10¢
Song, Barton's	dis 40¢ & 10¢
Song, Taylor's	dis 35¢ & 10¢
Crank, Brooks	dis 50¢ & 10¢
Crank, Coe's	dis 10¢
Crank, Connell's	dis 30¢ & 10¢
Lever, Sargent's	dis 60¢ & 10¢
Lever, Taylor's	dis 25¢ & 10¢
Lever, Taylor's, Japanned	dis 25¢ & 10¢
Lever, B. E. & Co.'s	dis 50¢ & 10¢
Full, Brook's	dis 50¢ & 10¢
Full, Western	dis 25¢ & 10¢

Cow.

Common Wrought	dis 60¢ & 10¢
Western, Sargent's list	dis 70¢ & 10¢
Kentucky "Star"	dis 70¢ & 10¢
Kentucky, Sargent's list	dis 70¢ & 10¢
Dodge, Genuine Kentucky, new list	dis 70¢ & 10¢
Texas Star	dis 50¢ & 10¢
Call	dis 40¢ & 10¢
Steel Alloy Churns and School Bells	dis 40¢
Bellows—diaphanites	dis 60¢ & 10¢ & 60¢
Molders	dis 40¢ & 10¢
Hand Bellows	dis 40¢ & 10¢
Belting, Rubber.	
Common Standard	dis 75¢ & 10¢
Standard	dis 70¢ & 10¢
Extra	dis 60¢ & 10¢
N. Y. B. & P. Co., Standard	dis 60¢ & 10¢
N. Y. B. & P. Co., Extra Standard	dis 50¢ & 10¢
Booth Steps.	
Worrell's	\$ dos. \$5—dis 50¢
Hochstetler's	\$ dos. \$5—dis 10¢ & 10¢
Diamond, per doz No. 1, \$10; No. 2, \$9	dis 25¢ & 10¢
McGill's	dis 53¢—dis 10¢
Bits—Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.	

Bit Holders.

Extension, Barber's	\$ dos. \$15.00—dis 40¢ & 10¢
Extension, Ives	\$ dos. \$20.00—dis 50¢ & 10¢
Extension, Jap. with Acorns	dis 40¢
Augers	\$ dos. \$24.00—dis 40¢
Blind Adjusters.	
Domestic	\$ per doz \$3.00—dis 35¢
Excelsior	\$ dos. \$10.00—dis 50¢ & 10¢
Washburn's Self-Loading	dis 30¢ & 10¢

Blind Fasteners.

Macrell's	\$ dos pairs, \$1.00—dis 30¢ & 10¢
Van Sand's Screw Pattern	\$15 \$ gro.—dis 60¢ & 10¢
Van Sand's Old Pattern	\$15 \$ gro.—dis 55¢ & 10¢
Washburn's Old Pattern	\$15 \$ gro.—dis 55¢ & 10¢
Merriman's	new list, net
Austin & Eddy No. 3008	\$15 \$ gro.—dis 55¢ & 10¢
Security Gravel	\$15 \$ gro.—dis 55¢ & 10¢
Blind Straps.	
Barbed, 1/2 in. and larger	\$ 7 1/2¢ & 5¢ net
Barbed, 1/2 in. and larger	\$ 8 1/2¢ & 5¢ net

Blocks.

Cleveland Block Co., Mal. Iron	dis 50¢
Novelty Tackle Blocks, Mal. Iron	dis 50¢

Belts.

Door and Shutter—	
Cast Iron Barrel, Square, &c.	dis 70¢ & 10¢
Cast Iron Shutter Bolts	dis 70¢ & 10¢
Cast Iron Chain (Sargent's list)	dis 65¢ & 10¢
Ives' Patent Door Bolts	dis 60¢
Wrought Barrel	dis 70¢ & 10¢
Wrought Square	dis 70¢ & 10¢
Wrt Shutter, all Iron, Stanley's list	dis 60¢ & 10¢
Wrt Shutter, Brass Knob, Stanley's	dis 40¢ & 10¢
Wrought Shutter, Sargent's list	dis 60¢ & 10¢
Wrought Sunk Flush, Sargent's list	dis 55¢ & 10¢
Wrought Sunk Flush, Stanley's list	dis 55¢ & 10¢
Wrought S.K. Flush, Com'n Stanley's list	dis 55¢ & 10¢

Carriage.

Com. list June 10, '84	dis 75¢ & 24¢ & 2¢
Genuine Eagle, list Oct. '84	dis 75¢ & 10¢
Phila. pattern, list Oct. '84	dis 75¢ & 10¢
H. B. & W. old list	dis 70¢

Common list Feb. 23, 1888.

P. C. B. & N. Co., Empire, list Feb. 23, 1888	dis 70¢
P. C. B. & N. Co., Philadel., list Oct. '84	dis 35¢
P. C. B. & N. Co., Keystone, Phil. list Oct. '84	dis 50¢
P. C. B. & N. Co., Phil. list Oct. '84	dis 75¢ & 10¢
Am. S. Co., Norway, Phil. list Oct. '84	dis 75¢ & 10¢
Am. S. Co., Eagle, Phil. list Oct. '84	dis 80¢
Am. S. Co., Philadel., list Oct. '84	dis 85¢
Am. S. Co., Ray State, list Feb. 23, 1888	dis 70¢
R. B. & W. Philadel., list Oct. 18, 1884	dis 82¢
R. B. & W. Mfg. Co.	dis 70¢

Stove and Flow.

Stove	dis 65¢
Flow	dis 60¢
Am. S. Co. Stove, Annealed	dis 65¢
R. B. & W. Stove	dis 65¢
R. B. & W. Stove	dis 65¢
R. B. & W. Stove	dis 65¢
Machine, according to size	dis 75¢ & 10¢
Bolt Engr, according to size	dis 75¢ & 10¢
Berax	\$ 7 1/2¢ & 10¢

Sewing Machines.

Without Augers, Upright	
Douglas	\$5.50
Snell's, Rice's Patent	\$5.50
Jennings	\$5.50
Other Machines	\$2.50
Phillips' Pat. with Augers 7.00	7.50

Self Pins.

Humason, Beckley & Co.'s	dis 60¢ & 10¢
Sargent & Co.'s	\$17 and \$18, dis 60¢ & 10¢
Peck, Stow & W. Co.	dis 50¢ & 10¢ & 10¢

Brackets.

Backus, Nos. 110 to 114 and 31 to 35	dis 60¢ & 10¢ & 10¢</
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Wrought (Steel)—
Fast Joint Narrow.....dis 70&10
Fast Joint, L. Narrow.....dis 70&10
Fast Joint, Broad.....dis 70&10
Loose Joint, Broad.....dis 70&10
Table Butts, Back Flange, &c.....dis 70&10
Inside Blind, Regular.....dis 70&10
Inside Blind, Light.....dis 70&10
Loose Pin.....dis 70&10
Browned Wrought Butts.....dis 40&10&40&10&5

Calipers.—See Compasses.

Calks, Tee
Gautier.....\$ 5 50
Dewicks.....\$ 5 50
Our Openers.
Messenger's Comet.....\$ 25.00, dis 25
American.....\$ 25.00, dis 25
Duplex.....\$ 25.00, dis 25
Lyman's.....\$ 25.00, dis 25
No. 1, French.....\$ 25.00, dis 25
No. 5, Iron handle.....\$ 25.00, dis 25
Bureau.....\$ 25.00, dis 25
Sardine Openers.....\$ 25.00, dis 25
Star.....\$ 25.00, dis 25
Sprague, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Cards
Horse and Curry.....dis 10&10 @ 10&10&10
Cotton.....New list, Aug., 1888, dis 10 @ 10&10
Wool.....dis 10 @ 10&10
Carpet Stretchers.
Cast Steel, Polished.....\$ 25.00, dis 25
Cast Iron, Steel Points.....\$ 25.00, dis 25
Bulldog.....dis 25 @ 25&10
Carpet Sweepers.
Bissell No. 5.....\$ 25.00, dis 25
Bissell No. 7 New Drop Pan.....\$ 25.00, dis 25
Bissell Grand Rapids.....\$ 25.00, dis 25
Grand Rapids.....\$ 25.00, dis 25
Crown Jewel.....No. 1, \$18; No. 2, \$19; No. 3, \$20
Magic.....\$ 25.00, dis 25
Jewel.....\$ 25.00, dis 25
Improved Parlor Queen, Nickel Trimmed.....\$ 25.00, dis 25
Improved Parlor Queen, Japanned Trimmed.....\$ 25.00, dis 25
Excelsior
Garland.....\$ 25.00, dis 25
Parlor Queen.....\$ 25.00, dis 25
Housewife's Delight.....\$ 25.00, dis 25
Queen.....\$ 25.00, dis 25
Queen, with band.....\$ 25.00, dis 25
King.....\$ 25.00, dis 25
Wood Improved.....\$ 25.00, dis 25
Hub.....\$ 25.00, dis 25
Cog Wheel.....\$ 25.00, dis 25
Cartridges.—See Ammunition.
Casters.
Bed.....New list, dis 55 @ 55&5
Patio.....Others, dis 60 @ 60&5
Deep Seater.....dis 40&10
Yale Casters, list May, 1888.....dis 40&10
Yale, Gem.....dis 60&5
Yale's Patent (Phoenix).....dis 45&10 @ 50
Payson's Anti-Friction.....dis 60 @ 60&10
"Giant" Truck Casters.....dis 10 @ 10&5
Stationary Truck Casters.....dis 45&10
Ottile.....dis 70
Humason, Beckley & Co.'s.....dis 60&10
Hutchinson.....dis 80
Peck Stow & W. Co.....dis 50&10
Chains
Trace, 5-10-2, exact sizes, \$ pair, \$1.05.....dis 50&10
Trace, 5-10-3, exact sizes, \$ pair, .92.....dis 50&10
Trace, 7-10-2, exact sizes, \$ pair, 1.11.....dis 50&10
NOTE.—Traces, "Regular" sizes \$2 net \$ pair less than exact.
Log, Fifth, Stretcher, and other rancy Chains, list Nov. 1, 1888.....dis 50&10 @ 50&10&5
American Coll 8-16 1/4 6-16 3/4 7-16 3/4 8-16 3/4 9-16 3/4 10-16 3/4 11-16 3/4 12-16 3/4 13-16 3/4 14-16 3/4 15-16 3/4 16-16 3/4 17-16 3/4 18-16 3/4 19-16 3/4 20-16 3/4 21-16 3/4 22-16 3/4 23-16 3/4 24-16 3/4 25-16 3/4 26-16 3/4 27-16 3/4 28-16 3/4 29-16 3/4 30-16 3/4 31-16 3/4 32-16 3/4 33-16 3/4 34-16 3/4 35-16 3/4 36-16 3/4 37-16 3/4 38-16 3/4 39-16 3/4 40-16 3/4 41-16 3/4 42-16 3/4 43-16 3/4 44-16 3/4 45-16 3/4 46-16 3/4 47-16 3/4 48-16 3/4 49-16 3/4 50-16 3/4 51-16 3/4 52-16 3/4 53-16 3/4 54-16 3/4 55-16 3/4 56-16 3/4 57-16 3/4 58-16 3/4 59-16 3/4 60-16 3/4 61-16 3/4 62-16 3/4 63-16 3/4 64-16 3/4 65-16 3/4 66-16 3/4 67-16 3/4 68-16 3/4 69-16 3/4 70-16 3/4 71-16 3/4 72-16 3/4 73-16 3/4 74-16 3/4 75-16 3/4 76-16 3/4 77-16 3/4 78-16 3/4 79-16 3/4 80-16 3/4 81-16 3/4 82-16 3/4 83-16 3/4 84-16 3/4 85-16 3/4 86-16 3/4 87-16 3/4 88-16 3/4 89-16 3/4 90-16 3/4 91-16 3/4 92-16 3/4 93-16 3/4 94-16 3/4 95-16 3/4 96-16 3/4 97-16 3/4 98-16 3/4 99-16 3/4 100-16 3/4 101-16 3/4 102-16 3/4 103-16 3/4 104-16 3/4 105-16 3/4 106-16 3/4 107-16 3/4 108-16 3/4 109-16 3/4 110-16 3/4 111-16 3/4 112-16 3/4 113-16 3/4 114-16 3/4 115-16 3/4 116-16 3/4 117-16 3/4 118-16 3/4 119-16 3/4 120-16 3/4 121-16 3/4 122-16 3/4 123-16 3/4 124-16 3/4 125-16 3/4 126-16 3/4 127-16 3/4 128-16 3/4 129-16 3/4 130-16 3/4 131-16 3/4 132-16 3/4 133-16 3/4 134-16 3/4 135-16 3/4 136-16 3/4 137-16 3/4 138-16 3/4 139-16 3/4 140-16 3/4 141-16 3/4 142-16 3/4 143-16 3/4 144-16 3/4 145-16 3/4 146-16 3/4 147-16 3/4 148-16 3/4 149-16 3/4 150-16 3/4 151-16 3/4 152-16 3/4 153-16 3/4 154-16 3/4 155-16 3/4 156-16 3/4 157-16 3/4 158-16 3/4 159-16 3/4 160-16 3/4 161-16 3/4 162-16 3/4 163-16 3/4 164-16 3/4 165-16 3/4 166-16 3/4 167-16 3/4 168-16 3/4 169-16 3/4 170-16 3/4 171-16 3/4 172-16 3/4 173-16 3/4 174-16 3/4 175-16 3/4 176-16 3/4 177-16 3/4 178-16 3/4 179-16 3/4 180-16 3/4 181-16 3/4 182-16 3/4 183-16 3/4 184-16 3/4 185-16 3/4 186-16 3/4 187-16 3/4 188-16 3/4 189-16 3/4 190-16 3/4 191-16 3/4 192-16 3/4 193-16 3/4 194-16 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Hickory Firmer Chisel, assorted. \$ gross 4.50
 Hickory Firmer Chisel, large. \$ gross 5.00
 Apple Firmer Chisel, assorted. \$ gross 5.00
 Apple Firmer Chisel, large. \$ gross 6.00
 Socket Firmer Chisel, assorted. \$ gross 3.00
 Socket Framing Chisel, assorted. \$ gross 5.00
 J. B. Smith Co.'s Pat. File. \$ dis 50
 File, assorted. \$ gross 2.75 \$ dis 40
 Auger, assorted. \$ gross 5.00 \$ dis 40
 Auger, large. \$ gross 7.00 \$ dis 40
 Patent Auger, lvs. \$ dis 30
 Patent Auger, Douglas. \$ set \$1.25 net
 Patent Auger, Swan's. \$ set \$1.00 net
 Hoe, Rake, Shovel, &c. \$ dis 50
 Cross Cut Saw Handles. \$ dis 50
 Atkins' No. 1 Loop, \$ pair, 80¢ No. 2, 22¢; No. 3
 and No. 4, Reversible, 25¢.
 Boynton's Loop Saw Handles. \$ dis 60
 Champion. \$ dis 150

Hangers.
 Barn Door, old patterns. \$ dis 60
 Barn Door, New England. \$ dis 70
 Salmon Steel Anti-Friction. \$ dis 50
 Orleans Steel. \$ dis 50
 Hamilton Wrought Wood Track. \$ dis 50
 U. S. Wood Track. \$ dis 50
 Rider and Wooster, Medina Mfg. Co.'s List. \$ dis 70
 Climax Anti-Friction. \$ dis 50
 Climax Steel Anti-Friction. \$ dis 50
 Zenith for Wood Track. \$ dis 50
 Reed's Steel Arm. \$ dis 50
 Challenge, Barn Door. \$ dis 50
 Sterling Improved (Anti-Friction). \$ dis 50
 Victor, No. 1, \$15; No. 2, \$16.50; No. 3, \$18. \$ dis 50
 Cherisher. \$ dis 50
 Kidder's. \$ dis 50
 The "Boss". \$ dis 50
 Best Anti-Friction. \$ dis 50
 Duplex (Wood Track). \$ dis 50
 Terry's Patent. \$ dis 50
 Crook's Patent. \$ dis 50
 Wood Track, Iron Clad. \$ dis 50
 Carrier Steel Anti-Friction. \$ dis 50
 Architect. \$ dis 50
 Holpess. \$ dis 50
 Richards. \$ dis 50
 Lane's Steel Anti-Friction. \$ dis 50
 The Ball Bearing Door Hanger. \$ dis 50
 Warner's Patent. \$ dis 50
 Stearns' Anti-Friction. \$ dis 50
 Stearns' Challenge. \$ dis 50
 Faultless. \$ dis 50
 American. \$ dis 50
 Rider & Wooster, No. 1, \$24; No. 2, \$26. \$ dis 50
 Paragon, No. 1, 2 and 3. \$ dis 50
 Paragon, No. 5, \$24, 7 and 8. \$ dis 50
 Crescent. \$ dis 50
 Nickel, Cast Iron. \$ dis 50
 Nickel, Malleable Iron and Steel. \$ dis 50
 Scranton Anti-Friction Single Strap. \$ dis 50
 Scranton Anti-Friction Double Strap. \$ dis 50
 Universal Anti-Friction. \$ dis 50
 Wild West, 4 in. wheel, \$15; 5 in. wheel, \$21. \$ dis 50
 Star. \$ dis 50
 May. \$ dis 50

Harness Snaps.—See Snaps.
Hatchets.—List Jan. 1, 1888.
 Isaiah Blood. \$ dis 35
 Hunt's Shingling Lath and Claw. \$ dis 40
 Hunt's Broad. \$ dis 40
 Buffalo Hammer Co. \$ dis 40
 Hurd's. \$ dis 40
 Fayette R. Plumb. \$ dis 40
 May Mann, Jr., & Co. \$ dis 40
 Underhill Edge Tool Co. \$ dis 40
 Underhill's Haines and Bright goods. \$ dis 40
 O. Hammond & Son. \$ dis 40
 Simmons. \$ dis 40
 Peck's. \$ dis 40
 Kelly's. \$ dis 40
 Sargent & Co. \$ dis 40
 Ten Eyck Edge Tool Co. \$ dis 40
 Collins, following list. \$ dis 40
 Shingling, Nos. 1, 2, 3. \$ dis 40
 Claw, Nos. 1, 2, 3. \$ dis 40
 Lathing, Nos. 1, 2, 3. \$ dis 40
 Hay Knives. \$ dis 40
 Lightning. \$ dis 40
 Electric. \$ dis 40
 Gem. \$ dis 40
 Wadsworth's. \$ dis 40
 Carter's Need. \$ dis 40
 Heath's. \$ dis 40

Hinges.
 Wrought Iron Hinges. \$ dis 40
 Strap and T. \$ dis 40
 Screw Hook and. \$ dis 40
 Strap. \$ dis 40
 Heavy Welded Hook. \$ dis 40
 Screw Hook and Eye. \$ dis 40
 Rolled Blind Hinges, Nos. 22 and 34. \$ dis 40
 Rolled Blind Hinges, Nos. 22 and 34. \$ dis 40
 Rolled Plate. \$ dis 40
 Rolled Raised. \$ dis 40
 Plate Hinges, 3, 10 & 12 in. \$ dis 40
 "Providence" over 12 in. \$ dis 40

Spring Hinges.
 Geer's Spring and Blank Butts. \$ dis 40
 Union Spring Hinge Co.'s List, March, 1886. \$ dis 40
 Acme and U. S. \$ dis 40
 Empire and Crown. \$ dis 40
 Hero and Monarch. \$ dis 40
 American, Gem, and Star, Japanned. \$ dis 40
 American, Gem, and Star, Bronzed. \$ dis 40
 Oxford, Bronze and Brass. \$ dis 40
 Barker's Double Acting. \$ dis 40
 Union Mfg. Co. \$ dis 40
 Bommer's. \$ dis 40
 Buckman's. \$ dis 40
 Chicago. \$ dis 40

Gate Hinges.
 Western. \$ dis 40
 N. E. \$ dis 40
 N. K. Reversible. \$ dis 40
 Clark's, Nos. 1 & 2. \$ dis 40
 M. Y. State. \$ dis 40
 Automatic. \$ dis 40
 Common Sense. \$ dis 40
 Seymour's. \$ dis 40
 Shepard's. \$ dis 40
 Reed's Latch and Hinges. \$ dis 40

Band Hinges.
 Parker. \$ dis 40
 Palmer. \$ dis 40
 Seymour. \$ dis 40
 Nicholson. \$ dis 40
 Huffer. \$ dis 40
 Clark's, Nos. 1, 2, 3, 4 and 50. \$ dis 40
 Clark's, Morse Gravity. \$ dis 40
 Sargent's, Nos. 1, 2, 3, 4, 11, 12. \$ dis 40
 Sargent's, No. 12. \$ dis 40
 Reading's Gravity. \$ dis 40

Shepard's Noiseless Niagara Buffalo, Champion,
 Steamboat, Clark's Old Pattern and Clark's Tip
 Pattern. \$ dis 75
 Shepard's O. S. Lull & Porter. \$ dis 75
 Shepard's Acme, Lull & Porter. \$ dis 75
 Shepard's Queen City Reversible. \$ dis 75
 Clark's Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. \$ dis 75
 North's Automatic Blind Picture, No. 1, for
 Wood, \$10.50; No. 2, for Brick, \$13.50. \$ dis 25
 Hees.
 Garden, Mortar, &c. \$ dis 65
 Planter's, Cotton, &c. \$ dis 65
 Warren Hoe. \$ dis 60
 Magie. \$ dis 47

Doors.
 D. & H. Scovill. \$ dis 20
 Lane's Crescent Scovill Pattern. \$ dis 45
 Lane's Crescent Planter's Pattern. \$ dis 45
 Lane's Razor Blade Scovill Pattern. \$ dis 30
 Maynard. \$ dis 45
 Sandusky Tool Co. \$ dis 60
 Hubbard & Co. \$ dis 60
 Grub. \$ dis 60
 Hees Rings and Rings.
 Still's Improved Rings. \$ dis 45
 Still's Old Style Rings. \$ dis 45
 Still's Tongue. \$ dis 45
 Still's Ring. \$ dis 45
 Perfect Rings. \$ dis 45
 Perfect Rings. \$ dis 45
 Blair's Hoe Rings. \$ dis 45
 Blair's Hoe Rings. \$ dis 45
 Champion Rings. \$ dis 45
 Champion Rings, Double. \$ dis 45
 Brown's Rings. \$ dis 45
 Brown's Rings. \$ dis 45
 Heesling's Rings. \$ dis 45
 "Moore's" Hand Holst, with Lock Brake. \$ dis 40
 "Moore's" Differential Pulley Block. \$ dis 40
 Holders. File and Tool. \$ dis 40
 Rals Pat. \$ dis 40
 Nicholson File Holders. \$ dis 40
 Hollow-Ware.
 Stove Hollow-Ware, Ground. \$ dis 70
 Stove Hollow-Ware, Unground. \$ dis 70
 Mameled and Tinned Hollow-Ware. \$ dis 70
 Kettles. \$ dis 70
 Oval Boilers, Saucepans & Glue Pots. \$ dis 70
 Gray Enamelled Ware. \$ dis 70
 Agate and Granite Ware. \$ dis 70
 Rustless Hollow-Ware. \$ dis 70
 Galvanized Tea-Kettles. \$ dis 70
 Inch. \$ dis 70
 Each. \$ dis 70
 Stove Painted—4 mo. or 5¢ cash in 30 days.
 Reed & Barton. \$ dis 40
 Meriden Britannia Co. \$ dis 40
 Simpson, Hall, Miller & Co. \$ dis 40
 Rogers & Brother. \$ dis 40
 Hartford Silver Plate Co. \$ dis 40
 William Rogers Mfg. Co. \$ dis 40
 Hees.
 Cast Iron.
 Bird Cage, Sargent's List. \$ dis 40
 Bird Reading. \$ dis 40
 Clothes Line, Sargent's List. \$ dis 40
 Clothes Line, Reading List. \$ dis 40
 Ceiling, Sargent's List. \$ dis 40
 Harness, Reading List. \$ dis 40
 Coat and Hat, Sargent's List. \$ dis 40
 Coat and Hat, Reading. \$ dis 40
 Wrought Iron.
 Cotton Pat. (N. Y. Mallet & Handle Wks.) \$ dis 30
 Tassel and Picture (T. & S. Mfg. Co.). \$ dis 30
 Wrought Staples, Hooks, &c. \$ dis 30
 Bench Hooks. \$ dis 30
 Wire.
 Wire Coat and Hat, Gem, list April, 1888. \$ dis 45
 Wire Coat and Hat, Mfg. list April, 1888. \$ dis 45
 Indestructible Coat and Hat. \$ dis 45
 Wire Coat and Hat, Standard. \$ dis 45
 Belt. \$ dis 45
 Grass. \$ dis 45
 Bush. \$ dis 45
 Whitmore-Patent. \$ dis 45
 Hooks and Eyes—Malleable Iron. \$ dis 45
 Hooks and Eyes. \$ dis 45
 Fish Hooks, American. \$ dis 45
 Horse Nails.
 Nos. 6, 7, 8, 9, 10
 Ausable. \$ dis 45
 Clinton. \$ dis 45
 Essex. \$ dis 45
 Lyra. \$ dis 45
 Snowden. \$ dis 45
 Putnam. \$ dis 45
 Vulcan. \$ dis 45
 Northwest. \$ dis 45
 Globe. \$ dis 45
 A. O. \$ dis 45
 C. B. K. \$ dis 45
 Champlain. \$ dis 45
 New Britain. \$ dis 45
 Saranac. \$ dis 45
 Champlain. \$ dis 45
 Capewell. \$ dis 45
 Star. \$ dis 45
 Anchor. \$ dis 45
 Western. \$ dis 45
 Empire. \$ dis 45
 Hees. Rubber, competition. \$ dis 45
 Standard. \$ dis 45
 Extra. \$ dis 45
 N. Y. B. & P. Co., Para. \$ dis 45
 N. Y. B. & P. Co., Extra. \$ dis 45
 N. Y. B. & P. Co., Dundee. \$ dis 45
 Blair's Adjustable. \$ dis 45
 Blair's Adjustable Clipper. \$ dis 45
 Jack Screws.—See Screws.
 Kettles. \$ dis 45
 Brass, 7 to 17 in. \$ dis 45
 Brass larger than 17 in. \$ dis 45
 Enamelled and Tea Kettles. \$ dis 45
 Keys.
 Lock Asses' list Dec. 30, 1886. \$ dis 45
 Eagle Cabinet, Trunk and Padlock. \$ dis 45
 Hotchkiss' Brass Blanks. \$ dis 45
 Hotchkiss' Copper and Tinned. \$ dis 45
 Hotchkiss' Padlock and Cabinet. \$ dis 45
 Ratchet Red Keys. \$ dis 45
 Kettle Sharpeners. \$ dis 45
 Parkin's Applewood Handles. \$ dis 45
 Parkin's Rosewood or Cocobolo. \$ dis 45
 Wilson's Butcher Knives. \$ dis 45
 Ames' Butcher Knives. \$ dis 45
 Nichols' Butcher Knives. \$ dis 45
 Ames' Shoe Knives. \$ dis 45
 Ames' Bread Knives. \$ dis 45
 Moran's Shoe and Bread Knives. \$ dis 45
 Hay and Straw. \$ dis 45
 Table and Pocket. \$ dis 45
 Door Pins. \$ dis 45
 Door Pin, Jar'd. \$ dis 45

Door Pin, Por. Nickel. \$ dis 45
 Door Pin, Plated, Nickel. \$ dis 45
 Drawer, Porcelain. \$ dis 45
 Hemacite Door Knob, new list. \$ dis 45
 Yale & Towne Wood Knobs, list Dec. 1885. \$ dis 45
 Furniture Plain. \$ dis 45
 Furniture, Wood Screws. \$ dis 45
 Rubber Tip. \$ dis 45
 Picture, Judd's. \$ dis 45
 Picture, Sargent's. \$ dis 45
 Picture, Hemacite. \$ dis 45
 Shutter, Porcelain. \$ dis 45
 Carriage, Japanned. \$ dis 45

Ladies.
 Melting Sargent's. \$ dis 45
 Melting, Reading. \$ dis 45
 Melting, Monroe's Patent. \$ dis 45
 Melting, P. S. & W. \$ dis 45
 Melting, Warner's. \$ dis 45

Lawn Mowers.
 Standard List. \$ dis 45
 Enterprise. \$ dis 45
 Lanterns.
 Tubular, Plain, with Guards. \$ dis 45
 Tubular, Lift Wire, with Guards. \$ dis 45
 Tubular, Square Plain, with Guards. \$ dis 45
 Tubular, Sq. Lift Wire, with Guards. \$ dis 45
 Without Guards, 25¢ dozen less. \$ dis 45
 Police, Small, \$6.00; Med. \$7.25; Large, \$8.75. \$ dis 45

Lemon Squeezers.
 Porcelain Lined, No. 1. \$ dis 45
 Wood, No. 2. \$ dis 45
 Wood, Common. \$ dis 45
 Ounlap's Improved. \$ dis 45
 Sammis'. \$ dis 45
 Sammis' Star. \$ dis 45
 The "Boss". \$ dis 45
 Dean's. \$ dis 45
 Little Giant. \$ dis 45
 King. \$ dis 45

Lines.
 Jotton and Linen Fish, Draper's. \$ dis 45
 Draper's Chalk. \$ dis 45
 Draper's Mason's Lines, 54 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25. \$ dis 45
 Jotton Chalk. \$ dis 45
 Samson, Cotton, No. 4, \$8; No. 4 1/2, \$8.50; No. 5, \$9.00; No. 5 1/2, \$9.50; No. 6, \$10.00; No. 6 1/2, \$10.50; No. 7, \$11.00; No. 7 1/2, \$11.50; No. 8, \$12.00; No. 8 1/2, \$12.50; No. 9, \$13.00; No. 9 1/2, \$13.50; No. 10, \$14.00; No. 10 1/2, \$14.50; No. 11, \$15.00; No. 11 1/2, \$15.50; No. 12, \$16.00; No. 12 1/2, \$16.50; No. 13, \$17.00; No. 13 1/2, \$17.50; No. 14, \$18.00; No. 14 1/2, \$18.50; No. 15, \$19.00; No. 15 1/2, \$19.50; No. 16, \$20.00; No. 16 1/2, \$20.50; No. 17, \$21.00; No. 17 1/2, \$21.50; No. 18, \$22.00; No. 18 1/2, \$22.50; No. 19, \$23.00; No. 19 1/2, \$23.50; No. 20, \$24.00; No. 20 1/2, \$24.50; No. 21, \$25.00; No. 21 1/2, \$25.50; No. 22, \$26.00; No. 22 1/2, \$26.50; No. 23, \$27.00; No. 23 1/2, \$27.50; No. 24, \$28.00; No. 24 1/2, \$28.50; No. 25, \$29.00; No. 25 1/2, \$29.50; No. 26, \$30.00; No. 26 1/2, \$30.50; No. 27, \$31.00; No. 27 1/2, \$31.50; No. 28, \$32.00; No. 28 1/2, \$32.50; No. 29, \$33.00; No. 29 1/2, \$33.50; No. 30, \$34.00; No. 30 1/2, \$34.50; No. 31, \$35.00; No. 31 1/2, \$35.50; No. 32, \$36.00; No. 32 1/2, \$36.50; No. 33, \$37.00; No. 33 1/2, \$37.50; No. 34, \$38.00; No. 34 1/2, \$38.50; No. 35, \$39.00; No. 35 1/2, \$39.50; No. 36, \$40.00; No. 36 1/2, \$40.50; No. 37, \$41.00; No. 37 1/2, \$41.50; No. 38, \$42.00; No. 38 1/2, \$42.50; No. 39, \$43.00; No. 39 1/2, \$43.50; No. 40, \$44.00; No. 40 1/2, \$44.50; No. 41, \$45.00; No. 41 1/2, \$45.50; No. 42, \$46.00; No. 42 1/2, \$46.50; No. 43, \$47.00; No. 43 1/2, \$47.50; No. 44, \$48.00; No. 44 1/2, \$48.50; No. 45, \$49.00; No. 45 1/2, \$49.50; No. 46, \$50.00; No. 46 1/2, \$50.50; No. 47, \$51.00; No. 47 1/2, \$51.50; No. 48, \$52.00; No. 48 1/2, \$52.50; No. 49, \$53.00; No. 49 1/2, \$53.50; No. 50, \$54.00; No. 50 1/2, \$54.50; No. 51, \$55.00; No. 51 1/2, \$55.50; No. 52, \$56.00; No. 52 1/2, \$56.50; No. 53, \$57.00; No. 53 1/2, \$57.50; No. 54, \$58.00; No. 54 1/2, \$58.50; No. 55, \$59.00; No. 55 1/2, \$59.50; No. 56, \$60.00; No. 56 1/2, \$60.50; No. 57, \$61.00; No. 57 1/2, \$61.50; No. 58, \$62.00; No. 58 1/2, \$62.50; No. 59, \$63.00; No. 59 1/2, \$63.50; No. 60, \$64.00; No. 60 1/2, \$64.50; No. 61, \$65.00; No. 61 1/2, \$65.50; No. 62, \$66.00; No. 62 1/2, \$66.50; No. 63, \$67.00; No. 63 1/2, \$67.50; No. 64, \$68.00; No. 64 1/2, \$68.50; No. 65, \$69.00; No. 65 1/2, \$69.50; No. 66, \$70.00; No. 66 1/2, \$70.50; No. 67, \$71.00; No. 67 1/2, \$71.50; No. 68, \$72.00; No. 68 1/2, \$72.50; No. 69, \$73.00; No. 69 1/2, \$73.50; No. 70, \$74.00; No. 70 1/2, \$74.50; No. 71, \$75.00; No. 71 1/2, \$75.50; No. 72, \$76.00; No. 72 1/2, \$76.50; No. 73, \$77.00; No. 73 1/2, \$77.50; No. 74, \$78.00; No. 74 1/2, \$78.50; No. 75, \$79.00; No. 75 1/2, \$79.50; No. 76, \$80.00; No. 76 1/2, \$80.50; No. 77, \$81.00; No. 77 1/2, \$81.50; No. 78, \$82.00; No. 78 1/2, \$82.50; No. 79, \$83.00; No. 79 1/2, \$83.50; No. 80, \$84.00; No. 80 1/2, \$84.50; No. 81, \$85.00; No. 81 1/2, \$85.50; No. 82, \$86.00; No. 82 1/2, \$86.50; No. 83, \$87.00; No. 83 1/2, \$87.50; No. 84, \$88.00; No. 84 1/2, \$88.50; No. 85, \$89.00; No. 85 1/2, \$89.50; No. 86, \$90.00; No. 86 1/2, \$90.50; No. 87, \$91.00; No. 87 1/2, \$91.50; No. 88, \$92.00; No. 88 1/2, \$92.50; No. 89, \$93.00; No. 89 1/2, \$93.50; No. 90, \$94.00; No. 90 1/2, \$94.50; No. 91, \$95.00; No. 91 1/2, \$95.50; No. 92, \$96.00; No. 92 1/2, \$96.50; No. 93, \$97.00; No. 93 1/2, \$97.50; No. 94, \$98.00; No. 94 1/2, \$98.50; No. 95, \$99.00; No. 95 1/2, \$99.50; No. 96, \$100.00; No. 96 1/2, \$100.50; No. 97, \$101.00; No. 97 1/2, \$101.50; No. 98, \$102.00; No. 98 1/2, \$102.50; No. 99, \$103.00; No. 99 1/2, \$103.50; No. 100, \$104.00; No. 100 1/2, \$104.50; No. 101, \$105.00; No. 101 1/2, \$105.50; No. 102, \$106.00; No. 102 1/2, \$106.50; No. 103, \$107.00; No. 103 1/2, \$107.50; No. 104, \$108.00; No. 104 1/2, \$108.50; No. 105, \$109.00; No. 105 1/2, \$109.50; No. 106, \$110.00; No. 106 1/2, \$110.50; No. 107, \$111.00; No. 107 1/2, \$111.50; No. 108, \$112.00; No. 108 1/2, \$112.50; No. 109, \$113.00; No. 109 1/2, \$113.50; No. 110, \$114.00; No. 110 1/2, \$114.50; No. 111, \$115.00; No. 111 1/2, \$115.50; No. 112, \$116.00; No. 112 1/2, \$116.50; No. 113, \$117.00; No. 113 1/2, \$117.50; No. 114, \$118.00; No. 114 1/2, \$118.50; No. 115, \$119.00; No. 115 1/2, \$119.50; No. 116, \$120.00; No. 116 1/2, \$120.50; No. 117, \$121.00; No. 117 1/2, \$121.50; No. 118, \$122.00; No. 118 1/2, \$122.50; No. 119, \$123.00; No. 119 1/2, \$123.50; No. 120, \$124.00; No. 120 1/2, \$124.50; No. 121, \$125.00; No. 121 1/2, \$125.50; No. 122, \$126.00; No. 122 1/2, \$126.50; No. 123, \$127.00; No. 123 1/2, \$127.50; No. 124, \$128.00; No. 124 1/2, \$128.50; No. 125, \$129.00; No. 125 1/2, \$129.50; No. 126, \$130.00; No. 126 1/2, \$130.50; No. 127, \$131.00; No. 127 1/2, \$131.50; No. 128, \$132.00; No. 128 1/2, \$132.50; No. 129, \$133.00; No. 129 1/2, \$133.50; No. 130, \$134.00; No. 130 1/2, \$134.50; No. 131, \$135.00; No. 131 1/2, \$135.50; No. 132, \$136.00; No. 132 1/2, \$136.50; No. 133, \$137.00; No. 133 1/2, \$137.50; No. 134, \$138.00; No. 134 1/2, \$138.50; No. 135, \$139.00; No. 135 1/2, \$139.50; No. 136, \$140.00; No. 136 1/2, \$140.50; No. 137, \$141.00; No. 137 1/2, \$141.50; No. 138, \$142.00; No. 138 1/2, \$142.50; No. 139, \$143.00; No. 139 1/2, \$143.50; No. 140, \$144.00; No. 140 1/2, \$144.50; No. 141, \$145.00; No. 141 1/2, \$145.50; No. 142, \$146.00; No. 142 1/2, \$146.50; No. 143, \$147.00; No. 143 1/2, \$147.50; No. 144, \$148.00; No. 144 1/2, \$148.50; No. 145, \$149.00; No. 145 1/2, \$149.50; No. 146, \$150.00; No. 146 1/2, \$150.50; No. 147, \$151.00; No. 147 1/2, \$151.50; No. 148, \$152.00; No. 148 1/2, \$152.50; No. 149, \$153.00; No. 149 1/2, \$153.50; No. 150, \$154.00; No. 150 1/2, \$154.50; No. 151, \$155.00; No. 151 1/2, \$155.50; No. 152, \$156.00; No. 152 1/2, \$156.50; No. 153, \$157.00; No. 153 1/2, \$157.50; No. 154, \$158.00; No. 154 1/2, \$158.50; No. 155, \$159.00; No. 155 1/2, \$159.50; No. 156, \$160.00; No. 156 1/2, \$160.50; No. 157, \$161.00; No. 157 1/2, \$161.50; No. 158, \$162.00; No. 158 1/2, \$162.50; No. 159, \$163.00; No. 159 1/2, \$163.50; No. 160, \$164.00; No. 160 1/2, \$164.50; No. 161, \$165.00; No. 161 1/2, \$165.50; No. 162, \$166.00; No. 162 1/2, \$166.50; No. 163, \$167.00; No. 163 1/2, \$167.50; No. 164, \$168.00; No. 164 1/2, \$168.50; No. 165, \$169.00; No. 165 1/2, \$169.50; No. 166, \$170.00; No. 166 1/2, \$170.50; No. 167, \$171.00; No. 167 1/2, \$171.50; No. 168, \$172.00; No. 168 1/2, \$172.50; No. 169, \$173.00; No. 169 1/2, \$173.50; No. 170, \$174.00; No. 170 1/2, \$174.50; No. 171, \$175.00; No. 171 1/2, \$175.50; No. 172, \$176.00; No. 172 1/2,

5 1/2	Flat Head Bronze	dis 60	5
5 1/2	Round Head Bronze.....	dis 60	5

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CURRENT METAL PRICES.

OCTOBER 31, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
3/4 to 2 in. round and square...	1.90 @ 2.00¢
1 to 6 in. x 3/4 to 1 in.	
Refined Iron:	
3/4 to 2 in. round and square...	2.10 @ 2.2¢
1 to 4 in. x 3/4 to 1 1/2 in.	
4 1/2 to 6 in. x 3/4 to 1 in.	2.30 @ 2.4¢
1 to 6 in. x 1/4 and 5-16	2.20 @ 2.3¢
Rods—3/4 and 1-1/2 round and sq.	2.30 @ 2.4¢
Bands—1 to 6 x 3-16 to No. 12	3.00 @ ...
"Burden Best" Iron, base price...	2.80 @ ...
Burden's "H. B. & S." Iron, base price...	2.80 @ ...
"Ulster"	3.10 @ ...
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery,	Per pound.
Toe Calk, Tire and Sleigh Shoe, base price in small lots	2 3/4¢ @ 3¢
Best Cast Steel, base price in small lots	5 1/4¢ @ 9 1/4¢
Best Cast Steel Machinery, base price in small lots	5 1/4¢ @ 6¢
For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see <i>The Iron Age</i> , June 21, 1888.	

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16	2.75 @ 2.80¢
17 to 20	2.85 @ 3.00¢
21 to 24	3.00 @ 3.10¢
25 and 26	3.20 @ 3.50¢
27 and 28	3.35 @ 3.75¢
28	3.50 @ 4.00¢
B. B.	2d qual.
Galv'd, 14 to 20	4.50 @ 4.88¢
Galv'd, 1 to 24	4.87 1/2 @ 4.75¢
Galv'd, 25 to 26	5.25 @ 5.12¢
Galv'd, 27	5.62 1/2 @ 5.48¢
Galv'd, 28	6.00 @ 5.85¢
Patent Planchet	A 10¢ B, 9¢
Russia	9 1/2¢ @ 10¢
American Cold Rolled B. B.	5¢ @ 7¢

English Steel from Store.

Best Cast	15¢
Extra Cast	16 1/2¢
Swaged, Cast	16¢
Best Double Shear	15¢
Blister, 1st quality	12 1/2¢
German Steel, Best	10¢
2d quality	9¢
3d quality	8¢
Sheet Cast Steel, 1st quality	15¢
2d quality	14¢
3d quality	12 1/2¢

METALS.

Tin.

Banca, Pigs	25¢
Straits, Pigs	25¢
English, Pigs	24 1/2¢
Straits in Bars	26¢

Tin Plates.

Charcoal Plates—Bright.	Per box.
Melyn Grade—IC 10 x 14	\$6.00 @ \$6.25
" " IC 12 x 18	6.25 @ 6.50
" " IC 14 x 20	6.00 @ 6.25
" " IC 20 x 28	12.50 @ 13.00
" " IX 10 x 14	7.50 @ 7.75
" " IX 12 x 12	7.75 @ 8.00
" " IX 14 x 20	7.50 @ 7.75
" " IX 20 x 28	15.50 @ 16.00
" " DC 12 1/2 x 17	5.75 @ 6.00
" " DX 12 1/2 x 17	7.25 @ 7.50
Call and Grade—IC 10 x 14	6.00 @ 6.25
" " IC 12 x 12	6.25 @ 6.50
" " IC 14 x 20	6.00 @ 6.25
" " IX 10 x 14	7.50 @ 7.75
" " IX 12 x 12	7.75 @ 8.00
" " IX 14 x 20	7.50 @ 7.75
Allaway Grade—IC 10 x 14	\$5.37 1/2 @ ...
" " IC 12 x 12	5.50 @ ...
" " IC 14 x 20	5.87 1/2 @ ...
" " IC 20 x 28	11.50 @ ...
" " IX 10 x 14	6.25 @ ...
" " IX 12 x 12	6.50 @ ...
" " IX 14 x 20	6.25 @ ...
" " IX 20 x 28	13.00 @ ...
" " DC 12 1/2 x 17 .....	.00 @ ...
" " DX 12 1/2 x 17	6.00 @ ...

Coke Plates—Bright.

Steel Coke—IC 10 x 14, 14 x 20	\$5.00 @ ...
" " 10 x 20	7.50 @ 7.65
" " 20 x 28	10.25 @ ...
BV Grade—IC 10 x 14, 14 x 20	4.60 @ ...
Charcoal Plates—Terne.	
Dean Grade—IC 14 x 20	\$4.62 1/2 @ ...
" " 20 x 25	9.25 @ ...
" " IX 14 x 20	5.62 1/2 @ ...
" " 20 x 28	11.37 1/2 @ ...
Abecarne Grade—IC 14 x 20	4.50 @ ...
" " 20 x 28	9.00 @ ...
" " IX 14 x 20	5.50 @ ...
" " 20 x 28	10.80 @ ...

Tin Boiler Plates.

IXX, 14 x 28	112 sheets @ \$12.50 @ \$12.75
IXX, 14 x 28	112 sheets @ 12.75
IXX, 14 x 31	112 sheets @ 14.25 @

Copper.

Duty: Pig. Bar and Ingot, 4¢; Old Copper, 3¢	
" " Manufactured (including all articles of which Copper is a component of chief value), 4 1/2¢ ad valorem.	

Ingot.

Lake	@ 18 1/4¢
"Anchor" Brand	@ 18¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound.							
			Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72			25	25	25	26	27	28	31	33
30—72			25	25	25	26	27	28	30	34
36—96			25	25	25	27	29	33	36	...
36—96			25	25	25	28	30	34	38	...
48—96			25	25	27	29	31	35	...	...
48—96			25	25	28	30	32	36	...	...
60—96			25	25	30	32	37	...	...	...
60—96			25	28	31	...	...	...	...	...
84—96			26	27	...	...	...	...	...	...
84—96			27	28	...	...	...	...	...	...
Over 84 in. wide			28	30	...	...	...	...	...	...

All Bath Tub Sheets..... 16 oz. 14 oz. 12 oz. 10 oz.
Per pound..... \$0.53 0.30 0.32 0.35
Bolt Copper, 3/4 inch diameter and over, per pound..... 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 8 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

14 ounce to square foot and heavier..... 28¢
12 ounce and up to 14 ounce to square foot..... 29¢
10 ounce and up to 12 ounce..... 31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 18 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each..... 8¢

Tinning sheets on one side, 30 x 60 each..... 30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each..... 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each..... 12¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each..... 12¢

Tinning sheets on one side, other sizes, per square foot..... 2 1/2¢

For tinning both sides double the above prices.

Planished Copper.

Planished Copper List May 5, 1888..... Net

Brass and Copper Tubes.

Seamless Copper..... Seamless Brass.

3/4 inch 50¢ 3/4 inch 47¢
1/2 inch 44¢ 1/2 inch 41¢
1/4 inch 42¢ 1/4 inch 39¢
3/8 inch 40¢ 3/8 inch 37¢
1/2 inch 38¢ 1/2 inch 35¢
1 inch 37¢ 1 inch 34¢
1 1/2 inch 34¢ 1 1/2 inch 31¢

Roll and Sheet Brass.

Discount from list..... 10 @ 15 %

Spelter.

Duty: Pig. Bars and Plates, \$1.50 @ 100 lb.
Western Spelter..... 5 1/4¢ @ 6¢
"Bergenport"..... 6 1/4¢ @ 7¢
"Bertha"..... 7 1/4¢ @ 8¢

Zinc.

Duty: Sheet, 2 1/4¢ @ 100 lb.
600 lb. casks..... 6 1/4¢
Per lb..... 7 1/4¢

Lead.

Duty: Pig. \$2 @ 100 lb. Old Lead, 2¢ @ 100 lb. Pipe and Sheets, 3¢ @ 100 lb.

American..... 4 1/4 @ 4 1/2¢
Newark..... 4 1/4 @ 4 1/2¢
Bar, subject to trade discount..... 5 1/2¢
Pipe, subject to trade discount..... 15¢
Tin-lined Pipe, subject to trade discount..... 45¢
Block Tin Pipes, subject to trade discount..... 8 1/4¢
Sheet, subject to trade discount..... 8 1/4¢

Solder.

1/2 @ 1/2 (Guaranteed)..... 16¢
Extra Wiping..... 13 1/2¢
The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson..... 13 1/4¢ @ 14¢
Hallett's..... 11 1/4¢

Plumbers' Brass Work.

Discount per cent.

Ground Bibbs and Stops..... 55¢ @ 10¢
Ground Stops, Hydrant Cocks, &c..... 55¢ @ 10¢
Corporation Cocks..... 55¢ @ 10¢

Corporation Cocks, "Mueller" Pattern, from Western list.

Ground Basin and Shampooing Cocks.....	50¢ @ 10¢
Compression Basin Cocks.....	50¢ @ 10¢
Compression Basin and Sink Cocks.....	50¢ @ 10¢
Compression Pantry Cocks.....	50¢ @ 10¢
Compression Double Basin and Shampooing Cocks.....	50¢ @ 10¢
Compression Double Bath Cocks.....	50¢ @ 10¢
Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks.....	50¢ @ 10¢
Basin Plugs and Basin Grates.....	55¢ @ 10¢
Bath and Wash Tray Plugs.....	55¢ @ 10¢
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets.....	55¢ @ 10¢
Basin Clamps, Basin Joints and Strainers.....	55¢ @ 10¢
Boiler Couplings, Ground Face, per set \$1.25.....	dis 10
Boiler Couplings, Plain Face, per set \$1.80.....	dis 10
Water Back Valve and Plain Couplings, Soldering Nipples and Unions.....	55¢ @ 10¢
Union Joints.....	60¢ @ 10¢
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides.....	55¢ @ 10¢
Hose Goods.....	55¢ @ 10¢

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.	
Brass Globe Valves.....	60¢ @ 10¢
Finished Brass Globe Valves, with Finished Brass Wheels.....	40¢ @ 10¢
Brass Globe Valves, with Patent Wood Wheels.....	60¢ @ 10¢
Brass Globe Angle and Corner Valves.....	60¢ @ 10¢
Brass Radiator Angle Valves.....	60¢ @ 10¢
Brass Radiator Angle Valves, Frink's Patent.....	60¢ @ 10¢
Brass Cross and Check Valves.....	60¢ @ 10¢
Brass Check Valves.....	60¢ @ 10¢
Brass Hose Valves.....	60¢ @ 10¢
Brass and Iron Frink Valves.....	60¢ @ 10¢
Brass Safety Valves.....	60¢ @ 10¢
Brass Vacuum Valves.....	50¢ @ 10¢
Brass Whistle Valves.....	60¢ @ 10¢
Brass Balance, Back Pressure and Foot Valves.....	50¢ @ 10¢
Brass Butterfly and Throttle Valves.....	50¢ @ 10¢
Brass Pump Valves.....	50¢ @ 10¢
Brass Steam Cocks.....	57 1/2¢ @ 10¢
Brass Service, Meter and Union Meter Cocks.....	57 1/2¢ @ 10¢
Brass Whistles, Water Gauges and Oil Cups.....	60¢ @ 10¢
Brass Hollow Plug, Tallow and Globe Oil Cups.....	50¢ @ 10¢
Brass Lubricators.....	60¢ @ 10¢
Brass Air Valves.....	60¢ @ 10¢
Brass Air Cocks.....	60¢ @ 10¢
Brass Gauge Cocks.....	55¢ @ 10¢
Brass Cylinder Cocks and Steam Bibbs.....	50¢ @ 10¢
Brass Swing Joints and Expansion Joints.....	50¢ @ 10¢
Brass Test Pumps.....	50¢ @ 10¢
Brass Steam Fittings, Rough.....	60¢ @ 10¢
Brass Steam Fittings, Finished.....	60¢ @ 10¢
Brass Union Joints.....	60¢ @ 10¢
Brass Soldering Unions and Nipples.....	55¢ @ 10¢
Brass Hose Fittings, Fusible and Boiler Plugs.....	55¢ @ 10¢
Iron Body Globe, Angle, Cross and Check Valves.....	65¢ @ 10¢
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves.....	65¢ @ 10¢
Iron Cocks, all Iron.....	65¢ @ 10¢
All Iron Valves.....	65¢ @ 10¢

Miscellaneous.

Discount per cent.	
Cast Iron Fittings.....	70¢ @ 10
Plugs and Bushings.....	75¢ @ 10
Malleable Iron Unions.....	67 1/2¢
Malleable Iron Fittings.....	75¢

Paints.

Black, Lamp—Coach Painters'.....	22¢ @ 24¢
" " Ordinary.....	6¢
Black, Ivory Drop, fair.....	12 @ 15¢
" " best.....	23¢
Black Paint, in oil.....	kegs, 8¢; assorted cans, 11¢
Blue, Prussian, fair to best.....	40 @ 55¢
" " in oil.....	45 @ 55¢
" " Chinese dry.....	70¢
" " Ultramarine.....	18 @ 30¢
Brown, Spanish.....	11¢
" " Van Dyke.....	10 @ 12¢
Dryers, Patent American, ass'd cans, 9¢; kegs, 7¢	
Green, Chrome.....	15 @ 23¢
Green, Chrome in oil.....	14 @ 25¢
Green, Paris.....	good, 20¢; best, 25¢
Green, Paris in oil.....	good, 30¢; best, 35¢
Iron Paint, Bright Red.....	21¢ @ 24¢
Iron Paint, Brown.....	21¢ @ 24¢
Iron Paint, Purple.....	21¢ @ 24¢
Iron Paint, Ground in oil, Bright Red.....	21¢ @ 24¢
Iron Paint, Ground in oil, Red.....	21¢ @ 24¢
Iron Paint, Ground in oil, Brown.....	21¢ @ 24¢
Iron Paint, Ground, Purple.....	21¢ @ 24¢
Litharge.....	6 1/4¢
Mineral Paints.....	2 @ 4¢
Orange Mineral.....	10¢
Red Lead, American.....	6 1/4¢
Red Venetian (Eng.) dry.....	\$1.65 @ \$1.70
Red Venetian in oil.....	ass't'd cans, 11¢; kegs, 8¢
Red Indian Dry.....	9 @ 12¢
Rose Pink.....	10 @ 13¢

THE IRON AGE

THURSDAY, NOVEMBER 8, 1888.

New Power Presses.

Among new presses recently put on the market by the E. W. Bliss Company, of Brooklyn, N. Y., are the two which we illustrate on this and the next page.

Fig. 1 represents a press, required for drawing up dish-pans, milk-pans, sauce-

think, by reference to the engraving. By means of a special device, the plunger may be lengthened or shortened very quickly, while the outer slide or mandrel is provided with means of adjustment, as shown by engraving.

The press is driven by pulleys, 24 inches by 6 inches on the back shaft, on which is

a very powerful machine, in compact form, occupying, as it does, a comparatively small floor space. A feature of interest to users is the adjustable table, to which the die, or lower knife for shearing, is secured. It has an adjustment of 9 inches in height, allowing a clear space between table and slide, varying from 4 to 13 inches, thus

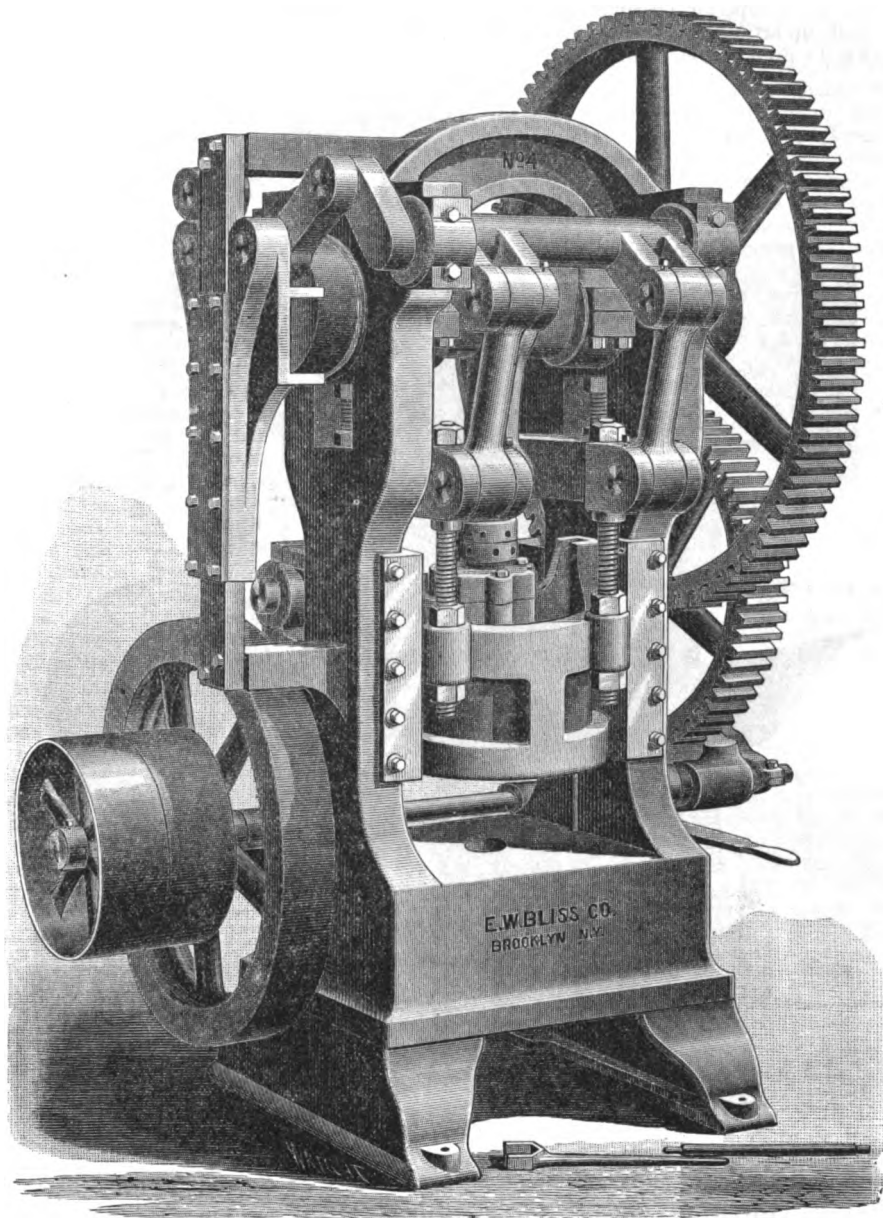


Fig. 1.

SHEET-METAL DRAWING PRESS, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

pans, trays, some articles of brass and copper, deep ironware, &c., &c. The main feature of this machine is the novel arrangement of links in connection with rock-shafts and slide, by means of which the blank holder or outer slide is pressed down, and remains stationary during a sufficient part of a revolution of crank to permit the plunger to descend and draw the blank into shape before releasing its hold and rising. A crank pin in the disk on the outer end of the shaft carries the slide attached to it up and down at every revolution of crank, thus operating the links and rock shafts above mentioned. This action will be clearly understood, we

mounted a fly-wheel 45 inches in diameter, and weighing 900 pounds, to give steadiness of motion. The large gear is 60 inches in diameter, and the proportion through the intermediate gearing, between it and the pinion on first shaft, is 28 to 1. All other parts of the machine are correspondingly strong, making it a very powerful press, suitable for making deep stamped ware requiring a blank not exceeding 26 inches in diameter; the finished work not exceeding 20 inches in diameter, nor 6 inches in depth. The weight, complete, is 21,000 pounds.

Fig. 2 illustrates a punching and shearing press. The design is such as to make

adapting it for a large variety of work not usually accommodated in a press of this kind. Any size opening may be cored in the table, not exceeding 6 x 10 inches, or 6 inches round. Two large holding bolts, one on each side of the table near the top, secure it firmly in position against the front of the press frame, while a projecting arm, or lug, cast on the under side of the table, rests on a large adjusting screw, as shown in the cut, giving ample support for the heaviest kind of cutting. For much of the work which this machine is adapted no gearing is required; a fly-wheel, 54 inches in diameter, weighing 1300 pounds, mounted on a shaft

where the gear is shown, giving ample power. But for very heavy cutting or punching, a 5-foot spur-gear is used, with pinion, making the proportion of gearing $7\frac{1}{2}$ to 1. This is driven by tight and loose pulleys, 24 x 5 inches, with a 36-inch fly-wheel, weighing 700 pounds, to give steadiness of motion. The slide has a 2-inch stroke, working in adjustable bearings. The machine throughout is built of the best material and workmanship, making it a desirable tool for manufacturers of iron and steel goods, iron railings, architectural ironwork, agricultural implements, &c., &c.

Deep Stampings.—The great superiority of stampings over built-up articles in metal is too well known to need to be

water tight without solder. The top of the can is closed with Griffin's lever opening lid, which also makes an air-tight joint by mere contact. It is proposed to make cans of large size by this process and to line them with enamel for the storage of many articles of food.

Preserving Exposed Ironwork.

A recent issue of *Industry*, of San Francisco, Cal., contains the following under the above head:

John Heald, the proprietor of the machine works at Crockett, Contra Costa County, has for some years past been experimenting with a view to preserving exposed ironwork, and has demonstrated some things respecting this important

pentine and white lead mixed thin, the very pores of the iron are closed. The interstices, to so call them, are too minute to receive the body which oil gives, but are closed by the thinner compound. This is the theory, but that is a matter of no consequence so long as the fact is known.

We recommend experiments with this method of protecting iron, an account of which we publish at Mr. Heald's suggestion, and any further information will no doubt be furnished if application is made to him. The preservation of surfaces beneath the light coat of a shipping mark is something which most every one has observed but never thought of as differing from the effect of common paint mixed with oil. The process will be an impor-

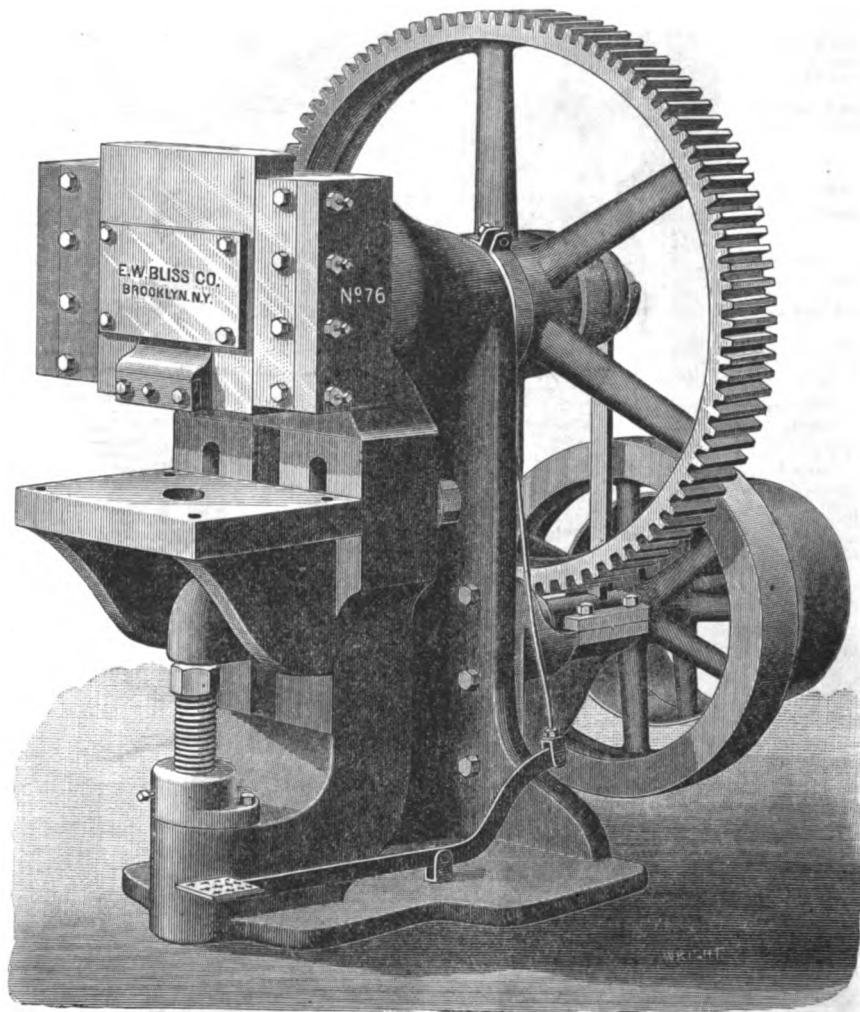


Fig. 2.

PUNCHING AND SHEARING PRESS, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

insisted upon. In cans for containing preserved provisions there is the additional advantage that when stamped there is no need to use solder in the internal joints, and hence the chance of lead poisoning is entirely removed. But deep stampings are very expensive to make, and a limit is soon reached beyond which the metal cannot be got to flow. To meet this difficulty Mr. Featherstone Griffin, of the Self-Opening Tin Box Company, has, according to *Engineering*, devised a method of building up stampings without solder. The bottom of a can or cask is stamped with a part of the cylindrical wall in the usual way; the remainder of the can is formed of similar stampings with the bottom cut off, leaving them short cylinders. The end of one cylinder is placed within the end of the next, and the joint is then passed between rolls, which corrugate it and make the union perfectly air and

matter that may be of great value. Mr. Heald some years ago had occasion to move a gas holder at Vallejo, and happened to notice on the old plates, which were badly corroded, that the "shipping marks" on the sheets were perfectly preserved. This led to the examination of other cases of the kind where marking had been done on ironwork, and also to experimenting with turpentine and white lead as a first coating to prevent rust. It is found that when surfaces are coated with finely ground lead thinned with spirits of turpentine, no corrosive action or scaling takes place, even when heavy coats of paint are afterward put on the outside. Mr. Heald says that common paint mixed with oil is too thick to penetrate or close the imperfections of the surface and penetrate beneath the scale where it exists, thus leaving places for corrosion to begin beneath the paint. With tur-

tant one for iron vessels, above water at least. The wash can be quickly put on, and will dry in a short time.

The city's rights in relation to wharf property having been more distinctly defined by the Court of Appeals, in the case of Wm. H. Kingsland, Mayor Hewitt recommends that measures be taken for completing the Dock Department's plan for the general improvement of the water front and the increase of wharfage facilities on both rivers.

Denver, Col., will soon have one of the finest Masonic temples in the West, costing not far from \$250,000. It will be seven stories high with a frontage of 125 feet and a depth of 100 feet. Every girder and beam throughout the building will be of iron, not even a wooden step or staircase being used.

Improvement of the Steam Engine.

In a paper entitled "The Distribution of Internal Friction of Engines," presented at the recent meeting of the American Society of Mechanical Engineers, Prof. Robert H. Thurston gave at length the results of a series of interesting tests made at different times with the view of correctly apportioning this friction. To the means employed for this purpose we have already briefly referred in our first report of the meeting. The plan, it will be remembered, consisted in first determining the whole friction of each engine tested, and then dismantling the engines, part by part, driving the connected parts by a pulley and belt from a line of shafting through a carefully standardized transmitting dynamometer.

Without going into all the details of the paper, it is of interest to note the conclusions at which Professor Thurston arrives. The improvement of the steam engine, he says, has to-day reached a point beyond which, in its thermodynamic relations, but little advance can be anticipated. Under usual conditions of operation of our very best engines, they are so near the efficiency of the ideal engine, working under precisely similar conditions, that the range of possible gain left to us is too small to permit us to look in that direction for rapid or important changes in further increase of efficiency and economy. Where the ideal engine would consume 10 pounds of steam per horse-power per hour, we have actually reached as little as 14, if the latest and best reports of the best of modern engines may be accepted as substantially correct; and even this 80 per cent. margin is reduced by practical conditions restricting expansion. If it were to be asserted that we may hope to bring the consumption of steam in good engines of the best type down to as low as 12 pounds per hour per horse-power, it is probable that the most experienced and best informed engineers would think it a somewhat rash statement; but that is what the tendency and rate of recent improvements would seem to promise for the immediate future, assuming that no very great increase in pressures and temperatures of steam may be expected. Practically, also, it is now known that the highest duty is not the most desirable, nor, on the whole, the most advantageous, condition of operation of the engine, and we are restricted to lower duties and reduced efficiencies whenever we consider financial relations. It is, nevertheless, the fact that the conditions of improvement are those which also give higher ratios of expansion. The duty to seek further means of improvement and higher efficiency becomes all the more imperative when we study the practical conditions under which our engines must be employed. Having, however, as just remarked, so nearly reached the limit of possible gain on the thermodynamic side, it becomes advisable to seek the more carefully for opportunities of improvement in other directions. We have, in the work outlined in this paper, both the directions shown us and the specific method of procedure suggested.

The real, final efficiency of the steam engine, or of any heat engine, is composed of the resultant of several distinct efficiencies, as the thermodynamic efficiency, the efficiency of the engine as a heat preserver and user, the efficiency as a machine, and the efficiency of a whole considered from a commercial standpoint. Of these several efficiencies we have the means of studying the efficiency of the machine as a division of the whole within which to seek the best means of securing a gain of total efficiency. The real and final efficiency is certain to be increased if we can effect an

improvement at this point, whatever the extraneous conditions of operation. Finding little chance of gain thermodynamically, it becomes our duty to ascertain what are the probabilities of securing progress elsewhere. It is at once seen that the difference here between the real and the ideal engine is greater than in the domain of thermodynamics, the best cases being in both instances taken. Those engines which are most nearly perfect thermodynamically are undoubtedly often least perfect, or at least of the least perfect types, when the efficiency of the engine as a machine is studied. Few of them have less than a total of 20 per cent. friction, while they are sometimes probably nearer the ultimate limit of improvement, practically, as converters of heat into work. We are now, for the first time in the history of the theory of the steam engine, in a position to say just where the losses of the machine are in detail, how we are to endeavor to reduce them, in what degree we may hope for such gain, and where it is to be found if effected at all.

The first and most remarkable fact to be noted is the extraordinary amount, absolutely and relatively, of the friction of the crank shaft. This amounts to nearly one-half of the whole waste, and to from 5 to 10 per cent. of the whole power of the engine, in the cases here examined. It is remarkable not only for its amount, but also because of the fact that we had begun to believe that, under similar conditions of pressure, speed of rubbing, and of lubrication, it was perfectly practicable to bring down the coefficient to less than 1 per cent. and perhaps to as little as one-tenth of 1 per cent. However, we find that this coefficient rises, in the unloaded engine, to about 0.30 as a maximum, and, as a minimum, to at least 0.09; while it only falls 0.04 in the best case, with the increase of pressure on the bearings due to full load and power. This is the more astonishing when it is considered that, on the axle of the car-wheel, it has been found often that the friction is a fraction of 1 per cent. and often as low as one-tenth per cent. Here is evidently the first place in which to seek further improvement. If this item can be brought down as low as in car-axle journals, the efficiency of the engine as a machine will be increased by about 5 per cent. in the very best cases, and by 10 per cent. in ordinary engines. How this is to be done can be best ascertained when it is found just what are the causes of this extraordinary and previously unsuspected loss. The only conditions apparent tending to aggregate this waste are the continuous rotation in one direction and the unintermitted pressure of the journal in its bearing. It would appear probable that it is a case of commonly imperfect lubrication. Could the oil-bath system in method and in results be secured here, it would seem probable that the friction might be enormously reduced. It would, even in many cases, if not in all, pay well to have a thoroughly reliable system of lubrication by means of a forcing pump that should insure the support of the journal upon a cushion of lubricant, thus making its action analogous to that of the "*palier glissant*" of Giffard and the "water bearing" of Shaw and of others.

The second and most obvious conclusion is that the valve should be balanced and so connected as to cause the least possible waste by friction through its motion or that of its moving connections. There is evidently no probable line of improvement so certain to yield a large and profitable result as this. The balancing of the valve has been accomplished, and frequently, during many years past, so successfully that there is no excuse for neglecting this point in even the cheapest classes of engines. No engine can be considered as belonging to the best class which is not either pro-

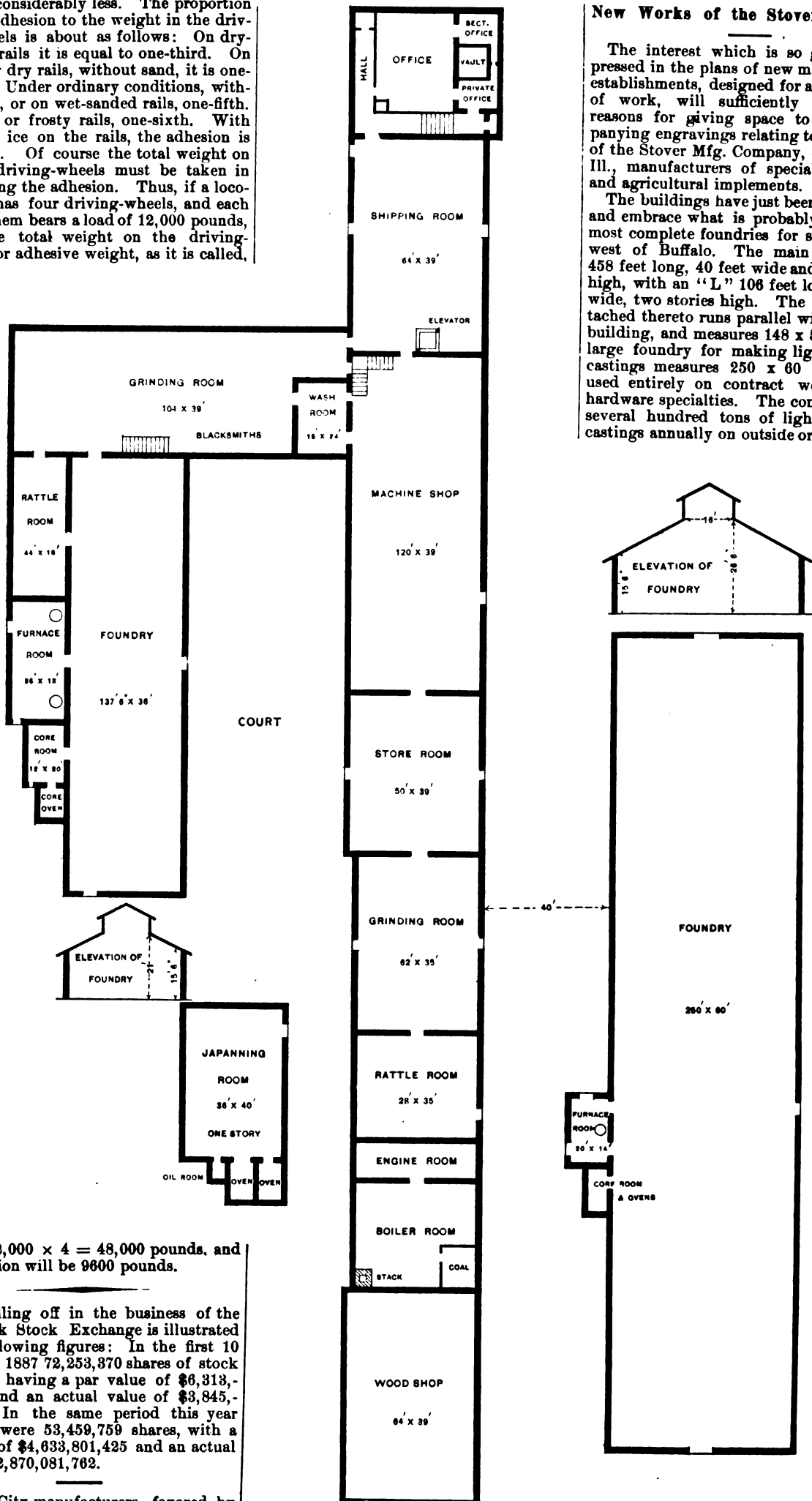
vided with a balanced valve or which has not a system of valve gear, as with some of the "drop cut-off" engines, in which the loss in this direction is rendered insignificant. Here lies an opportunity to raise the efficiency of mechanism of ordinary engines at least 5 per cent., and of the best of engines with unbalanced valves 2 or 3 per cent. It is evidently better, in many cases, to have a valve which is balanced, though slightly leaky at times, than to use an unbalanced valve, though absolutely tight at all times. The simple fact, here revealed, that nine-tenths of this friction may be avoided is very important.

The third item in order of importance is the friction of piston and its rod. This is as great as that just referred to, and is vastly more variable with the class of engine, and probably in the same engine with differences in handling, and especially in setting up packing and springs, where they exist. The writer has often known the power of an engine to be sensibly affected by the carelessness or inexperience of the attendant, who had screwed up his packing in the rod stuffing-box too tightly, and has, on more than one occasion, had a similar experience where the rings were set out too hard. The metallic packings and the unpacked pistons and rods now coming slowly into use will unquestionably do much to remedy this defect of the average engine. Meantime, with the older design, it is perfectly possible to keep piston and stuffing-box tight without wasting much power or by slowing down the engine by conversion of heat into work at points where the operation is likely to produce serious harm as well as waste. Rings are much oftener too tight than too loose, and a stuffing-box should only be set up when the engine is running, and then only with fresh packing and not more than is sufficient to check any visible leakage. New packing in a well-made box never needs much compression, and when it becomes necessary to screw it down hard it is time to replace it by new. Any packing that compels severe compression when new should be promptly condemned.

The remaining items are of minor importance as bearing upon the efficiency of the machine, and they are all obviously easily taken care of by a good designer and a good engineer in charge. Here, if anywhere, it is the fact that freedom of lubrication is the essential consideration, and the more nearly most absolutely flooded the parts can be, and the more absolutely certain lubrication can be made, the better, and irrespective, also, to a great extent, of the cost of the lubricant. Any lubricant freely used can be filtered and cleansed in such manner and so effectively that its more or less free supply to the bearing is a matter of no consequence as a matter of first cost; while the cost of wasted power and fuel, and of repairs due to excessive friction and wear, will usually enormously exceed any apparent gain in that direction.

Slipping of Locomotive Drivers.—Mr. M. U. Forney, in the *Railroad and Engineering Journal*, says that the force required to make locomotive driving-wheels slip will vary very much with the condition of the rails. If they are quite dry and clean it will require a force equal to about one-fourth the weight on the wheels. That is, supposing we have a wheel attached to a frame which is fastened so that it cannot move, and that the wheel rests on a rail and is loaded with, say, 12,000 pounds, if a rope or chain could be attached exactly at the tread of the wheel, and carried over a pulley, then it would require a weight of about 3000 pounds attached to the end of the rope to make the wheel slip. If the rails were sanded, the adhesion would be somewhat greater, and if they were wet or muddy or

greasy, considerably less. The proportion of the adhesion to the weight in the driving-wheels is about as follows: On dry-sanded rails it is equal to one-third. On perfectly dry rails, without sand, it is one-fourth. Under ordinary conditions, without sand, or on wet-sanded rails, one-fifth. On wet or frosty rails, one-sixth. With snow or ice on the rails, the adhesion is still less. Of course the total weight on all the driving-wheels must be taken in calculating the adhesion. Thus, if a locomotive has four driving-wheels, and each one of them bears a load of 12,000 pounds, then the total weight on the driving-wheels, or adhesive weight, as it is called,



New Works of the Stover Mfg Co.

The interest which is so generally expressed in the plans of new manufacturing establishments, designed for a special class of work, will sufficiently explain our reasons for giving space to the accompanying engravings relating to the works of the Stover Mfg. Company, of Freeport, Ill., manufacturers of special machinery and agricultural implements.

The buildings have just been completed, and embrace what is probably one of the most complete foundries for small articles west of Buffalo. The main building is 458 feet long, 40 feet wide and two stories high, with an "L" 106 feet long, 40 feet wide, two stories high. The foundry attached thereto runs parallel with the main building, and measures 148 x 58 feet. The large foundry for making light gray iron castings measures 250 x 60 feet, and is used entirely on contract work, mostly hardware specialties. The company make several hundred tons of light gray iron castings annually on outside orders besides

will be $12,000 \times 4 = 48,000$ pounds, and the adhesion will be 9600 pounds.

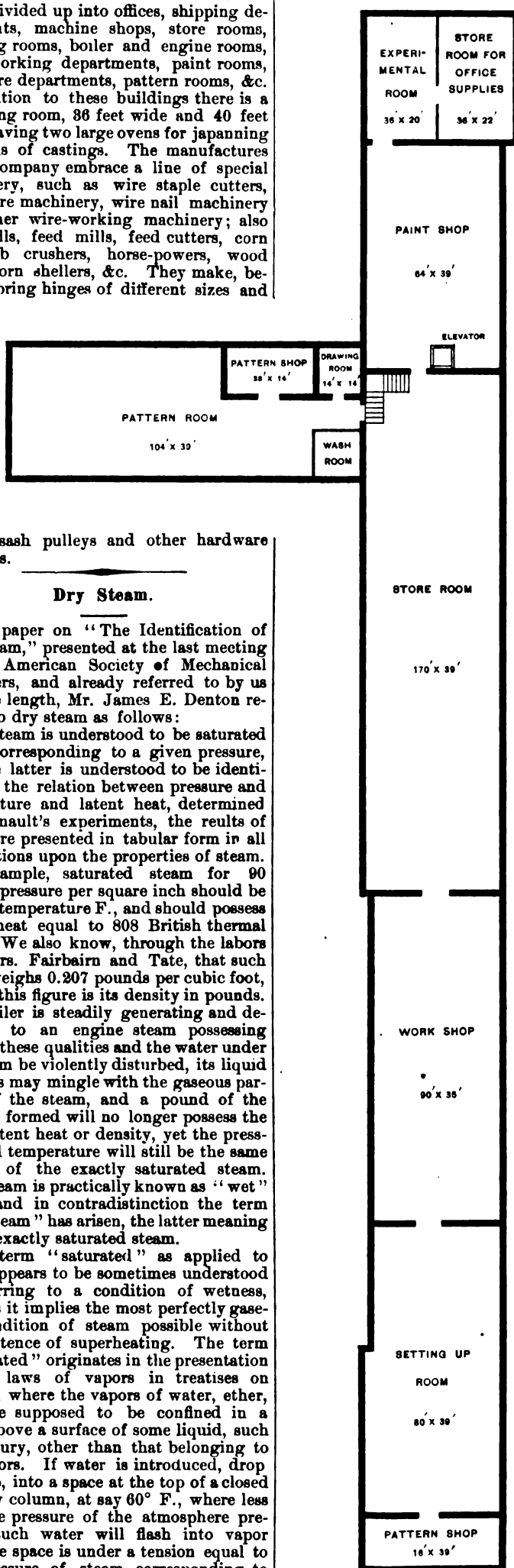
The falling off in the business of the New York Stock Exchange is illustrated by the following figures: In the first 10 months of 1887 72,253,370 shares of stock were sold, having a par value of \$6,313,396,325 and an actual value of \$3,845,025,768. In the same period this year the sales were 53,459,759 shares, with a par value of \$4,633,801,425 and an actual value of \$2,870,081,762.

Kansas City manufacturers, favored by shorter railroad connections, have formed a syndicate to engage in direct trade with Mexico

Fig. 1.—General Ground Plan.

NEW WORKS OF THE STOVER MFG. COMPANY, FREEPORT, ILL.

doing their own work. The main building is divided up into offices, shipping departments, machine shops, store rooms, finishing rooms, boiler and engine rooms, wood-working departments, paint rooms, hardware departments, pattern rooms, &c. In addition to these buildings there is a japanning room, 86 feet wide and 40 feet long, having two large ovens for japanning all kinds of castings. The manufactures of the company embrace a line of special machinery, such as wire staple cutters, barb wire machinery, wire nail machinery and other wire-working machinery; also windmills, feed mills, feed cutters, corn and cob crushers, horse-powers, wood saws, corn shellers, &c. They make, besides, spring hinges of different sizes and



styles, sash pulleys and other hardware novelties.

Dry Steam.

In a paper on "The Identification of Dry Steam," presented at the last meeting of the American Society of Mechanical Engineers, and already referred to by us at some length, Mr. James E. Denton referred to dry steam as follows:

Dry steam is understood to be saturated steam corresponding to a given pressure, and the latter is understood to be identified by the relation between pressure and temperature and latent heat, determined by Regnault's experiments, the results of which are presented in tabular form in all publications upon the properties of steam. For example, saturated steam for 90 pounds pressure per square inch should be at 320° temperature F., and should possess latent heat equal to 808 British thermal units. We also know, through the labors of Messrs. Fairbairn and Tate, that such steam weighs 0.207 pounds per cubic foot, or that this figure is its density in pounds. If a boiler is steadily generating and delivering to an engine steam possessing exactly these qualities and the water under the steam be violently disturbed, its liquid particles may mingle with the gaseous particles of the steam, and a pound of the mixture formed will no longer possess the same latent heat or density, yet the pressure and temperature will still be the same as that of the exactly saturated steam. Such steam is practically known as "wet" steam, and in contradistinction the term "dry steam" has arisen, the latter meaning simply exactly saturated steam.

The term "saturated" as applied to steam appears to be sometimes understood as referring to a condition of wetness, whereas it implies the most perfectly gaseous condition of steam possible without the existence of superheating. The term "saturated" originates in the presentation of the laws of vapors in treatises on physics, where the vapors of water, ether, &c., are supposed to be confined in a space above a surface of some liquid, such as mercury, other than that belonging to the vapors. If water is introduced, drop by drop, into a space at the top of a closed mercury column, at say 60° F., where less than the pressure of the atmosphere prevails, such water will flash into vapor until the space is under a tension equal to the pressure of steam corresponding to 60° temperature. Then if more water be introduced into the space, it refuses to

vaporize, but accumulates as liquid water on the surface of the mercury, and consequently the space, and hence the vapor in that space, is said to be "saturated." Before the space or vapor is thus saturated the vapor of water present is "non-saturated" steam, and, if compressed, its pressure increases without causing any liquefaction, the vapor following the laws of fixed gases, like air, &c. When the space or vapor becomes saturated any compression of the vapor does not result in increased pressure (the temperature being assumed constant), but instead some vapor liquefies. Similarly the steam in a practical boiler (where there is always liquid water beneath the steam) is saturated, because any effort to make a given weight of steam occupy less space, either by raising the water level or by other compression of the steam, causes a portion of this weight of steam to liquefy without changing the vapor tension, assuming the temperature of the contents of the boiler to remain constant. The only practical at all condition corresponding to "non-saturation" as described in physics is when steam is superheated. If a sufficient portion of the heating surface of the boiler above the water line be exposed to the action of the fire, the pressure of the steam may remain the same, and yet its temperature may be greater, the latent heat greater, and the density less than corresponds to saturated steam. Such steam is practically known as superheated steam.

In measuring the performance of a boiler the essential determination is the quantity of heat utilized by the generation of steam. If the steam generated at say 90 pounds pressure is dry steam, then for each pound of feed water the boiler is to be credited with utilizing 120 heat units, due to the temperature of the steam if the feed water is at 200° F., and 808 heat units due to its latent heat, or a total of 928 heat units. If, however, 10 per cent. of the steam is liquid water mechanically mixed with 90 per cent. of dry steam, then for each pound of feed water the boiler is to be credited with 1.10×120 heat units, due to temperature, and 0.90×808 heat units, due to latent heat, or a total of 859 heat units, which is 92 per cent. of the dry steam total. Unless, therefore, allowance for the presence of moisture is made, the efficiency of a boiler is made too great for ordinary steam pressures, at the rate of $\frac{1}{5}$ per cent. for each 1 per cent. of water in the steam. Again, if steam at 90 pounds pressure is superheated 10° F., so that its temperature is 330° F., then for each pound of feed water at 200° F. we must credit the boiler with the heat due to dry steam plus $0.48 \times 10^\circ = 4.8$ heat units, so that failure to allow for superheating makes the efficiency of a boiler, at ordinary pressures, too low by about 0.05 per cent. for each degree F. of superheating.

It is customary among experts to make these allowance in reporting the performances of boilers, and hence arises the necessity of determining to what extent the steam generated by a given boiler differs from exactly dry steam. If the steam is superheated, the simple observance of its temperature by a proper thermometer affords the desired data. If, however, the steam is shown by a thermometer to be at exactly the temperature due to saturation, it may contain any amount of water in suspension, and the determination of the amount of the latter can in general only be accurately known by a measurement of either the latent heat or density of a known weight of the mixture. The determination of the density is an operation too delicate to have been yet attempted with portable apparatus. The determination of latent heat involves simply the condensation or mixture of a known weight of steam in or with a known weight of some other substance of known specific

Fig. 2.—Second-Floor Plan.

heat, and the operations to be performed are such as can be carried out with apparatus of a convenient portable nature.

Recent Legal Decisions.

PARTNERSHIP.

A firm engaged in making agricultural implements organized itself into a corporation to conduct a like business, and the members of the firm each were to get the value of their interest in stock. C.'s portion was \$20,000 of the capital stock, \$17,500 of which he sold or exchanged for a house and lot. Before the change was fully carried out C. died, and on the distribution of the stock \$17,500 were delivered to the grantor of the house and lot and \$2500 to the executors of C. When the corporation was created the members of the firm considered it entirely solvent, but it turned out that it was, at that time, unable to pay its debts, and S., N. & Co., Limited, a creditor of the firm, sued the executors to compel the application to the payment of its demand of the \$2500 of stock, and of the property conveyed for the \$17,500 of the stock. Individual creditors of C. were made parties to this suit—Singer, Nimick & Co., Limited, *vs.* Carpenter—and they contended that the partnership creditors were not entitled to a preference on the stock distributed to C. The trial court decided against the S., N. & Co., and the intermediate court affirmed the judgment, but a further appeal was made to the Supreme Court of Illinois, where the S., N. & Co. were again defeated. Judge Scholfield, in the opinion, said: "The law does not recognize that the creditor of a firm has a superior equity to that of the individual creditor of a member of the firm for payment from the partnership's assets. It recognizes, however, that the members of the partnership have a superior lien on the partnership property for the payment of the firm debts, and allows the creditors to avail themselves of this lien, to the exclusion of individual creditors, where it has not been surrendered to the partners. The other partners here having joined with the deceased partner in the contract to form the corporation, and distribute the stock therein in the proportion of their respective interests are, of course, concluded by it if he was bound. While that contract did not vest a present title, it vested a right in the corporation to have it performed, and, by reason of the peculiar property to be transferred—partly real and partly personal—and the personal property having its peculiar value by reason of its adaptation to use in connection with the use of that realty, an equity vested in the corporation to have that particular property, and a Court of Chancery would therefore have decreed a specific performance of the contract at the instance of the corporation, it not being in default. It would, moreover, seem that as the money the S., N. & Co. are claiming to appropriate is money derived from subsequent sales of the stock of the corporation, that, of itself is sufficient to deny its right to it. The stock was not partnership property, and its proceeds cannot be. If the partnership property did not vest in the corporation pursuant to the contract, it is just as it was before the attempted transfer, and the firm creditors may resort to it; and if the corporation issued stock to the individual for which it had not been paid, and to which the individual was not entitled, the loss is manifestly upon the corporation, and not upon the creditors of the firm of which the individual was a member. But if the partnership property did vest in the corporation, the interest of the partners in it was thereby terminated, and with their interest terminated that of the firm creditors."

In equity it was a conversion of partnership property into individual property as of the date of the contract."

RESTRAINT OF TRADE—CONTRACT TO CONTROL THE MARKET.

A lumber corporation made an agreement with two persons who were manufacturers of lumber in Santa Cruz County, Cal., by which they were to supply them 2,000,000 feet of lumber during the year, at \$11 a thousand, and these persons stipulated that they would not make any lumber to be sold during the year, in the counties of Monterey, San Benito, Santa Cruz and Santa Clara, except under this contract, and as a penalty pay \$20 a thousand for any lumber made and sold in these counties to other persons. The contract was not carried out, and the corporation sued for damages. In this case—Santa Clara Valley Mill and Lumber Company *vs.* Hayes—the court found that the contract sued upon was made for the purpose of limiting the supply of lumber made in these counties, and to increase the price of it in the State under a combination among all the lumber dealers in or near Felton, in Santa Cruz County, to control the lumber market for the year, and that the contract was void, as against public policy, it being in restraint of trade. The defendants had judgment, and plaintiff carried the case to the Supreme Court of California, where the plaintiff was again defeated. The Chief Justice (Searles), in the opinion, said: "When there is fraud or mistake in a contract the parties to it may have relief for the personal injury, but when it is an illegal contract society is injured, because the motive of wrong-doing in it is far-reaching. This illegality may be in the consideration, or in the promises and stipulations of the agreement. Among the contracts illegal under the common law, because opposed to public policy, were contracts in general restraint of trade—contracts between individuals to prevent competition, and keep up the price of articles of utility. In a New York case—*Arnot vs. Coal Company*—it was found that the contract involved therein limited the mining of coal at a certain colliery at Pittston, Pa., for the purpose of controlling the supply of coal for the market at Elmira, N. Y. The defendant was the head of a combination to effect this end, and it refused to pay the Pittston Company for coal delivered to it under the contract, upon the ground that it had sold coal to other parties, in violation of its agreement. *Arnot* became its assignee, and sued for the coal delivered. The New York Court of Appeals, in declaring the contract invalid, said: 'A combination to effect such a purpose as this is inimical to the interest of the public; all contracts designed to effect such an end are contrary to public policy, and therefore illegal, as is well settled by adjudicated cases. Every producer or vendor of coal or other commodity has the right to use all legitimate efforts to obtain the best price for the articles in which he deals, but when he endeavors to artificially enhance prices by suppressing or keeping out of the market the product of the labor of others, and to accomplish that purpose by the means of contracts binding such other persons to withhold their supply, such restraints are even more mischievous than combinations not to sell under an agreed price. Combinations of that character have been held to be against public policy, and illegal.'"

It is a remarkable roll of munificent bequests that John Guy Vassar, of Poughkeepsie, has left. He has bequeathed \$250,000 to a hospital, \$100,000 to an orphan asylum, \$65,000 to an aged men's home and \$145,000 to educational institutions, besides large sums to other objects.

The Lebel Rifle.

In a recent issue we referred briefly to the fact that the extreme curiosity which has been manifested for some time past as to the construction of the Lebel rifle, of which 350,000 are now being issued to the French army, had, in a measure, been satisfied by the publication, through the French Minister of War, of illustrations and a description of the weapon in *Instruction sur l'armement de l'infanterie*. We take pleasure in reproducing the engravings in this issue, being indebted for the particulars to the *London Engineer*.

The weapon is really a modification of the Gras rifle of 1885, which, in its turn, was a modified Kropatchek, in use in the French Navy since 1878. The principal modification is in the caliber, which has been reduced from 0.472 inch to 0.315 inch. The diminished weight of the weapon and its ammunition is a matter of very great importance, while the new powder employed renders, it is claimed, the small bore bullet as efficient as the large bore was with ordinary powder. A further improvement has been effected in the block which takes the force of recoil, which now works on two tenons, instead of as hitherto being supported only on one side.

The magazine is parallel with the barrel. In it the cartridges are placed end to end. A spring with a button on the end forces the cartridges toward the rear into a species of spoon, A, by which the cartridge is raised into such a position that it is readily thrust forward into the chamber by the action of the sliding breech block C P. A detent, G, prevents the next cartridge from finding its way under the spoon. By means of the thumb button L the repeating mechanism can be locked, and the rifle can then be fired as an ordinary breech-loader.

Fig. 1 is an elevation showing the rifle with the breech closed, ready for firing. Fig. 2 is a top view. Fig. 3 shows the rifle in section with the breech block open; an empty cartridge is still in the jaws of the extractor ready to be thrown out at the top. In Fig. 4 the cartridge has been ejected and the spoon contains a cartridge ready to be pushed into the chamber by the act of closing the breech. The locking and percussion mechanism are identical with those of the Gras rifle. The new weapon measures all over, with its sword bayonet, 4 feet 8½ inches, and weighs 9½ pounds with eight cartridges in the magazine.

The proposed Congress of American nations in 1889, for the purpose of adopting a uniform system of weights and measures, a common silver coinage, laws for the regulations of patents, copyrights, trade-marks, &c., and an equitable method of settling all International disputes, is regarded by not a few as claiming an importance that can hardly be overestimated. With impending strikes and certain branches of trade paralyzed by over-production, it is inexplicable that our manufacturers should not have made greater efforts to compete with the English, French and Germans, in Spanish-America, a market which, geographically considered, we should easily control. If time ever becomes an item of value to our easy-going Southern neighbors, our share of this enormous and highly lucrative commerce should speedily rise above the shameful and meager tenth, with which we seem at present contented, and our merchandise should be carried, too, in American ships.

At Columbus, Ohio, November 1, the works of the Columbus Bridge Company were destroyed by fire. Loss is estimated at \$20,000, of which \$15,000 is on machinery.

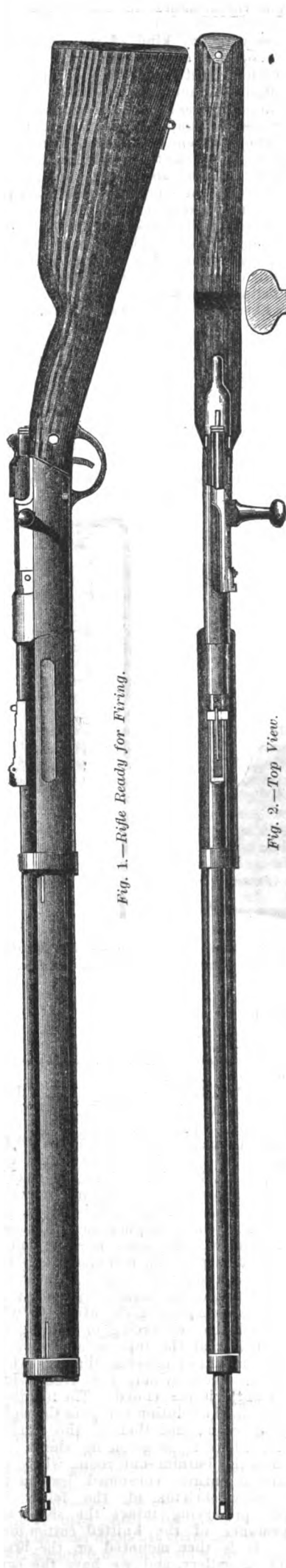


Fig. 1.—Rifle Ready for Firing.

Fig. 2.—Top View.

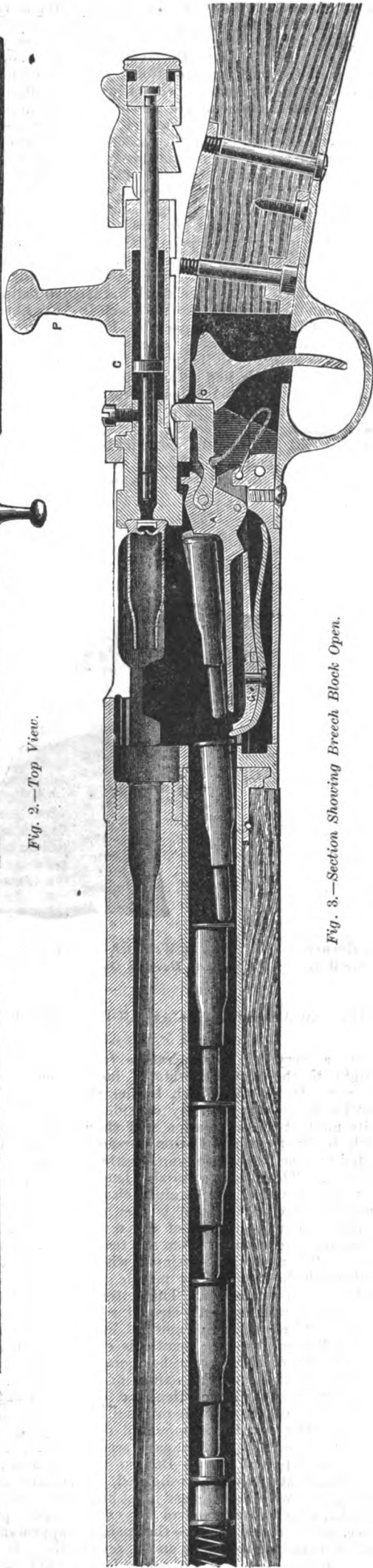


Fig. 3.—Section Showing Breech Block Open.

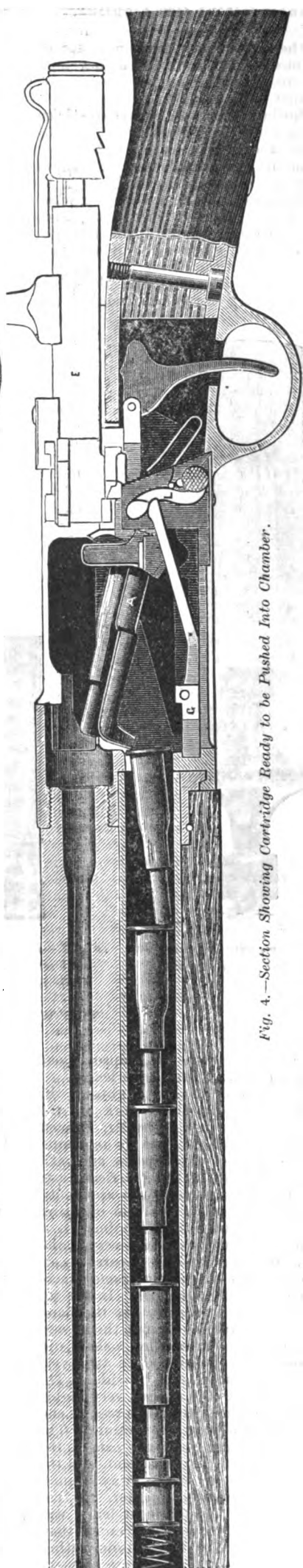


Fig. 4.—Section Showing Cartridge Ready to be Pushed Into Chamber.

THE NEW RIFLE FOR THE FRENCH ARMY.—THE LEBEL MAGAZINE RIFLE.

Incandescent Gas Lighting.

Of the new fields of usefulness for gas companies which have been developed since the introduction of the electric light first threatened to seriously affect their business, that of incandescent gas lighting has been watched with no little interest, and now seems to offer every promise of commercial success. Incandescent gas lights, so-called, from the start appeared to be of a character which would enable them to successfully compete with electric lamps of the incandescent type, and, while some of the early attempts at putting them into use were not in all respects successful, the results indicated pretty clearly what might be ex-

pected of them with the improvements suggested by even a brief experience. Probably one of the first lights of this class shown in practical work in this country was that devised by Mr. Fahnehjelm. It was exhibited, as we remember it, somewhat over three years ago, at a New York meeting of the American Institute of Mining Engineers, and apparently demonstrated that the problem of utilizing the great intensity of combustion of water-gas could be solved in a very simple manner. Mr. Fahnehjelm's apparatus consisted essentially of an iron frame placed over an ordinary gas burner. In the top of this frame, so arranged that the flame from the burner impinged upon them, were two parallel rows of needles, a short distance apart and looking like two very coarse combs placed side by side. The needles consisted of magnesia very highly compressed under hydraulic pressure and then baked at a high temperature. The heat of the burning water-gas caused the needles to become incandescent, and the resulting light, in every way equal, and in some respects superior, to that from an electric incandescent lamp, was naturally much more satisfactory than that supplied by ordinary illuminating gas. The magnesia needles were adjust-

able and could be raised or lowered according to the size of the water-gas flame and the degree to which they became worn by the intense heat. As to the cost of the light—an important consideration—it was stated that the magnesia combs would bear about 80 hours of active service and cost only from 2½ to 3 cents apiece, while the water gas could be supplied at 50 cents per 1000 cubic feet, leaving, at this figure, considerable margin for profit. The gas consumption was stated to be no greater than with coal gas. A Chicago company was subsequently formed to develop the system, though up to the present the light has not been extensively introduced.

Greater success appears to have attended what is known as the Welsbach burner, which is in the hands of the Welsbach Incandescent Gas Light Company, of Philadelphia, and of which we give several engravings. Before describing this burner, to which we already had occasion to refer when it was first brought out abroad, it may be interesting to note that incandescent gas lights in general have been found to fail because the material to be acted upon by the heat of the gas usually was present in considerable mass and re-

ing at the incandescent electric light. The convenient shape of the mantle adapts it to use with any kind of gas with efficiency. Its steadiness renders it the perfection of light for reading or fine work at night. It should be noted that ordinary illuminating gas is used, though the burner can also be employed to great advantage with both fuel and natural gas. The mantles can be made so as to give a white light or a yellow light of any degree, and a white light could therefore be furnished where it was required for special manufacturing or other purposes, and a brilliant, so called 1 per cent. yellow light for the usual domestic purposes. We understand that the results obtained with this burner applied to natural gas and to manufactured fuel gas have been most flattering, an efficiency of from 10 to 12 candles per foot of gas burned being readily attained. In the matter of economy it should be observed that the only part of the lamp that will require renewal is the mantle, and as the mantles, under ordinary care, will last for periods of from 800 to 2000 hours, and can be renewed at a small cost this item affects the economy of the system only in an insignificant degree. In practice the



Fig. 1.—Complete Welsbach Incandescent Gas Burner.



Fig. 2.—Bunsen Burner, as Used with the Welsbach Burner.

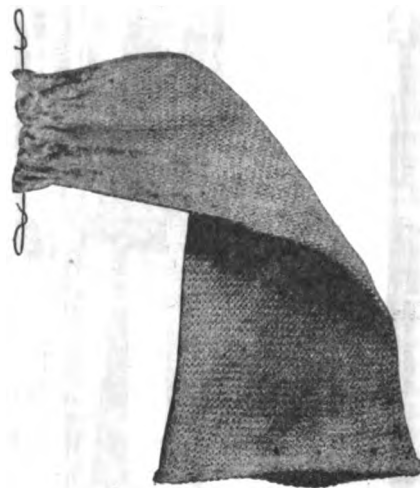


Fig. 3.—The Welsbach Mantle Before the Cotton is Burned Out.



Fig. 4.—The Mantle Ready for Use.

THE WELSBACH INCANDESCENT GAS LIGHT BURNER.

quired a very high temperature to be brought to the required state of incandescence. In the Welsbach burner this point has been very carefully considered, as its method of preparation will show, which is briefly this: Cotton thread is knitted by machinery into long lengths of stockinet. This is cut to suitable lengths for the lamp mantles, very carefully cleaned from all foreign matter, and is then dipped into a solution of salts of the metals lanthanum, zirconium, yttrium and several others. When dry, a platinum wire is run through the hem of the mantle, and it is hung on a wire arbor. The cotton is then ignited and carefully shaped while burning. After an hour or more of burning in a Bunsen flame the mantle is completely oxidized. The cotton has gone off as carbon dioxide, and the oxides of the metals remain in the same reticulated form and fibrous structure that the original cotton had. The mantle is mounted on a light gallery to take an ordinary argand chimney, and placed over a Bunsen burner. Immediately the gas is lighted, the mantle glows with a soft, steady, yet brilliant light, which emanates from its entire surface, and does not produce that painful effect of branding its image on the retina of the eye that is experienced when look-

ing at the incandescent electric light. The convenient shape of the mantle adapts it to use with any kind of gas with efficiency. Its steadiness renders it the perfection of light for reading or fine work at night. It should be noted that ordinary illuminating gas is used, though the burner can also be employed to great advantage with both fuel and natural gas. The mantles can be made so as to give a white light or a yellow light of any degree, and a white light could therefore be furnished where it was required for special manufacturing or other purposes, and a brilliant, so called 1 per cent. yellow light for the usual domestic purposes. We understand that the results obtained with this burner applied to natural gas and to manufactured fuel gas have been most flattering, an efficiency of from 10 to 12 candles per foot of gas burned being readily attained. In the matter of economy it should be observed that the only part of the lamp that will require renewal is the mantle, and as the mantles, under ordinary care, will last for periods of from 800 to 2000 hours, and can be renewed at a small cost this item affects the economy of the system only in an insignificant degree. In practice the

mantles would require renewal about every 500 or 1000 hours. The Welsbach Company has a large factory at Gloucester, N. J., and is introducing machinery and organizing a force to make from 25,000 to 30,000 burners per day. It has erected its own fuel-gas works, and, besides the machinery and apparatus for reducing minerals, has a complete chemical laboratory, machine shop, elaborate photometrical rooms, &c. The working force is so organized that each step in the manufacture is carried on in a separate room. First comes the knitting of the mantle by machinery, and then a corps of girls attend to what is called the reinforcing or folding the mantle over at the top, so as to have a larger amount of material through which to thread the platinum wire from which the mantle is suspended. The mantle is dipped in the solution and goes through a drying room, and then to the forming room, where it is given its shape, and then to the burning-out room, where the cotton is entirely consumed, leaving the refractory skeleton of the fabric behind, preserving intact the shape and appearance of the knitted cotton mantle. It is then mounted on the brass-work or gallery, and we have the com-

pleted lamp.

Completed lamp.

plete burner. For purposes of shipment the mantle, after having been burned as described, is dipped in a solution that entirely prevents any damage in transit. At present the light is being developed for large burners, and with these, we are informed, a greater efficiency can now be secured than with the smaller ones. There is claimed to be a large saving of gas and an absence of smoke, sulphur and fumes, points which should readily commend the light to the public.

One other form of burner which has become known to some extent is that controlled by the Lungren Incandescent Gas Light Company, of New York, and invented by Mr. Charles M. Lungren. The burner is formed of a paste of refractory earth pressed through dies into the shape of fine pencils or spirals. Two different forms shown in Figs. 5 and 6, have been made, one of them consisting of a flat coil connected to a platinum wire by means of which it is suspended within the flame of a T-shaped burner. From the upper surface of this the gas issues through a double row of perfor-

tention chiefly to adapting his burner to water-gas, but, it is claimed, it may be made available for the ordinary gas supply by making the refractory frame sufficiently delicate to be raised to the necessary incandescence, by the lower temperature flame of an atmospheric burner.

We understand that there are a great variety of shapes in which the incandescent portion can be made.

The three types of burner which we have considered are, so far as we know, the only ones with which anything like practical work has thus far been done in this country. What has already been accomplished with them, however, is of a most encouraging character, and incandescent gas lighting may soon be a generally applied system of illumination.

Marine Boiler Efficiency.

In going over the question as to the commercial value of forced draft the London *Engineer* recently said:

With the exception of the Great East-

what form a boiler may take, the conditions of working are the same as though a long tube was caused to traverse the water to be evaporated, and in one end of that tube the fire was maintained, while the products of combustion escaped at the other end. The temperature at the furnace end will be so many degrees, which we shall call T , and that at the chimney end will be t number of degrees, and $T-t$ the heat imparted to the water, other things being, as we have said, equal. But so long as the heating surface remains unaltered, it is well known that as T goes up so will t . The boiler has yet to be made in which t is dependent on the temperature of the water only, and independent of that of the furnace. It may be argued that this is quite true, but that so long as the difference between T and t remain unaltered the economical efficiency of the boiler *en rapport* with the fuel will remain unaltered. But this is certainly not true, because the efficiency of the boiler is measured not by the difference between T and t , but by the difference between t and t' , the temperature of the air entering the furnace; and the larger t is the greater the waste. Those who claim that coal can be burned to greater advantage with a high than with a low furnace temperature in a marine boiler must be prepared to prove that the difference between t and t' is less when the furnace temperature is exalted than when it is low. This they have never done yet. There is not one scrap of evidence to be had in favor of such a contention.

The fight between the Messrs. Cox and the Lehigh Valley Railroad Company, says the *Philadelphia Press*, is the beginning of a contest which may result disastrously to the coal-carrying companies. They occupy a position which cannot be defended. The great mistake was to be so greedy this year as to force somebody to make a fight. After the injudicious advance in coal prices and tolls in July and August it was certain that the row would soon begin, and possibly that the whole matter would go before the Legislature next winter. The cost to the coal-carrying companies is likely, one way and another, to be two or three times as much as they have made by their short-sighted policy this summer and fall. It is true the anthracite companies for a long series of years mined and sold coal at too low a price, and that some kind of concerted action was necessary to improve the trade. When this combination was made, and especially after harmony between the Reading and Pennsylvania was established, it was thought that the good sense and conservatism of the gentlemen who control the trade would be reflected in any action that might be taken. This has not proved to be the case, and this year the control passed into the hands of time servers, who have aroused a strong public sentiment by a sharp advance in prices and a heavy charge for carrying coal, which puts a further tax on the consumer. The result will be an overhauling of the whole matter by the Interstate Commission and probably by the Legislature. If the carrying companies suffer they will have nobody to blame but themselves.

The Minerva Furnace, at Milwaukee, Wis., now operated by the Milwaukee Furnace Company, produced 2494 gross tons of Bessemer pig iron in October, on ores averaging a little under 60 per cent. During the summer, when out for repairs, this furnace was lined up to 14½ feet in diameter at the bosh, and it is only 55 feet high. It is, therefore, but a small furnace to average over 80 tons a day. The fuel consumption has been very greatly reduced this campaign as compared with the previous one.

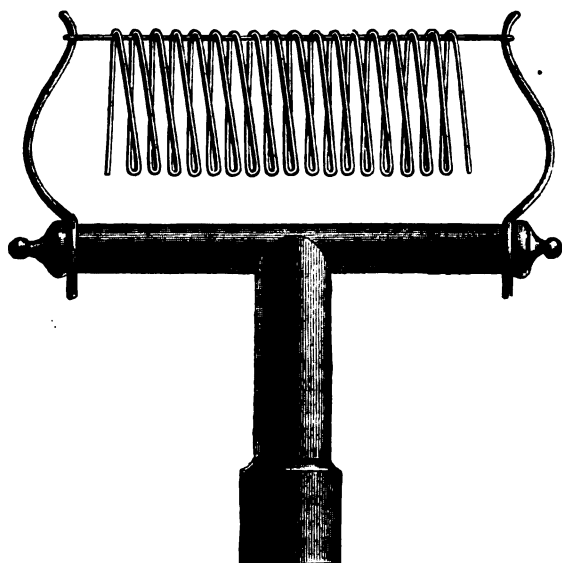


Fig. 5.—Flat Burner.

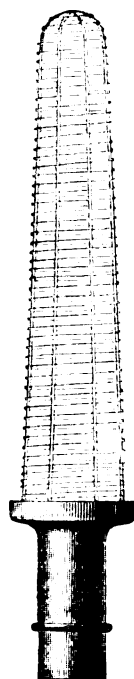


Fig. 6.—Pyramid Burner.

THE LUNGREN INCANDESCENT GAS LIGHT.

ations. A surrounding globe protects the incandescent material from injury. A second form consists of a coil of refractory earth wound over four uprights. These uprights are considerably heavier than the coil and are designed to bear such a relation to it that the coil may burn nearly all away before they will be destroyed, thus providing against the sudden collapse of the incandescent structure. The coils are wound close together at the bottom to give the incandescent frame additional strength at this point. After the incandescent material has been sufficiently burned, it is mounted in a light metal cap having an annular gutter at its top. This gutter is filled with a plastic composition, by means of which the refractory frame is cemented to the metallic cap. There is, therefore, no occasion for touching the incandescent portion of the structure in handling it to place it on the burner. As additional security, the incandescent structure may be wrapped in paper, which will readily burn off when the gas is lighted. The burner used with this form of mantle will depend upon the character of the gas. Mr. Lungren has heretofore given his at-

tern, there is probably not a steamer afloat the top of whose funnel is 100 feet above the level of the grate bars: About 75 feet may be regarded as over the average a long way. It is not easy to say how many tenths of an inch of water this type of chimney will give, because the controlling conditions are so variable, and practically no data taken from actual practice are available. We should say that 3 inches or 4 inches will probably be over the mark at the furnaces. Now, 3 square feet of heating surface with this draft will suffice to give an indicated horse-power; and it is found necessary to provide a certain definite amount of steam room and water surface to prevent priming. Engineers have gone on year after year supplying boilers in which these proportions are observed, and the results have been very satisfactory. It is argued nowadays that they have in effect been putting more boilers, or bigger boilers, than necessary into ships; and that in effect something much less than 3 square feet per horse-power will suffice. Obviously, other things being equal, this can only be true provided more heat is caused to pass through the plates and tubes of the boiler per minute. No matter

Fire-room Practice Aboard Ship.

Referring to the failure of the steamer City of New York thus far to beat the record and the possible reason to be found in the excessively hot fire-rooms and quarters provided for the firemen, preventing efficient work, the London *Engineer* speaks as follows of fire-room practice generally:

The temperature in both boiler and engine-rooms is often needlessly high. This is due to various causes, but the most important cause is neglect of obvious precautions on the part of some one who has had to do with putting the engines and boilers into the ship. In large deep vessels the lower platforms in the engine-rooms are nearly always cool. The upper platforms, especially about the high-pressure cylinder end, are atrociously hot. There are two ways in which this can be avoided. One consists in providing ample facilities for the escape of hot air. It will not do, however, to rest content with opening skylights above the engine-room. Hot air can only get out if cold air gets in to take its place. If dependence is placed solely on the skylights or gratings over the engines, there will be a constant fight between cold air trying to get in and hot air trying to get out. Wind sail ventilators should be carried right down to the bottom of the engine-room. With their aid a constant rush up through the skylights will be secured, to the great comfort of the engineers. It is hardly necessary to add that the cold air should be distributed, not shot, so to speak, all in one place. Another means of reducing temperature consists in most carefully clothing steam-pipes and cylinders. It is a common practice, for example, to put a false checkered plate cover on a high-pressure cylinder lid. The true lid radiates heat to this until it attains nearly the same temperature as that of the steam in the cylinder. In all cases some good non-conducting material should be interposed between the false and the true lids. Many materials are available, such as sand, slag wool or asbestos.

In shallow ships the fire-rooms are usually fairly cool. Under the wind sails, at all events, a cold breeze can be found; but in deep ships the case is different. The draft down the wind sails is very local and the fire-rooms rise to temperatures of 120° or 130°. No European can work to advantage under such conditions. Much of the excessive heat is caused by radiation from the ash-pits, which might be greatly reduced by the use of screens, which have been used, we understand, with success in some foreign ships. They can be removed or replaced in a moment. Some fire doors, again, seem to be specially constructed to roast the stokers; the doors simply become red-hot. Again, sufficient care is not taken to screen the smoke-box doors and the uptakes are not half as well protected as they might be. We have heard it argued, we are sorry to say, that the expenditure of a few pounds in making things comfortable is waste of money. No statement could be more shortsighted. In the hands of the firemen lies to a great extent the success or failure of a ship intended to be fast; and money spent in making these men comfortable when off duty, so that they may get sufficient rest, is money well spent. Not half enough care is taken to provide conditions under which they can work to advantage in the stokehole. There are, of course, exceptions, but the exceptions only bring into more glaring contrast the strange neglect of everything which can add to the efficiency of the stoker manifested in other ships.

The New Jersey Zinc and Iron Company have been exploring with the diamond drill on Mine Hill, a part of the famous

Franklin and Sterling zinc, iron and manganese deposit, with success. The company own all the minerals in Mine Hill, with the exception of the Franklinite. They drilled on the Curtis property, going to a depth of 540, running into the Hill vein of iron. During the course of the drilling they struck the zinc vein in a thickness of 19 feet, samples being now in the hands of a chemist for analysis. This discovery insures them a fresh supply of zinc ore for many years to come.

Steel versus Iron for Roofing.

A controversy has been going on for some time in the columns of *The Metal Worker*, on the relative merits of iron and steel sheets for roofing purposes. It is urged that a good deal of material is sold as steel which is impure and simple, and that considerable quantities of the sheets sold as steel are compound, the belief being expressed at least in one case, that not a manufacturer of iron roofing in the United States is using a single sheet of all steel. A letter to *The Metal Worker* from E. N. Thompson, of the Thompson Manufacturing Company, Cleveland, contains the following:

We begin with tin roofing. This, as is well known, is laid in two ways: first, the flat seam in which the lock is malleted down close all around the sheet. This takes a good quality of either iron or steel to do the work perfectly. Second, the standing seam in which a lower grade of steel or iron can be used, and still do perfect work. Either of these modes of laying require a better grade of iron or steel than any iron or so-called steel roofing manufactured by any manufacturer of iron roofing. The different kinds of iron roofing and siding can be grouped into three classes, so far as quality of material to be used in their manufacture is concerned.

First—Roll roofing, in which the standing seam is made on the roof, and in which the seam is somewhat similar to standing-seam tin.

Second—Pressed standing-seam roofing, in which the caps or standing seams are a part of the sheet itself.

Third—Corrugated, crimped and beaded iron and roll-cap roofing, the separate caps of the latter being made of a better quality when made in longer lengths than the width of the iron.

Now, we assert that an all-steel sheet cannot be made by any sheet mill in the United States and sold as cheaply as iron, or a mixture of iron and steel, to do the work required of it in the above three classes of iron roofing and siding.

As bearing on some of the issues raised, one of the most prominent manufacturers of sheets in Pittsburgh, writes: "Composite sheets in the gauges you name can be made in either of three ways: one side may be steel and the other iron, both sides steel with iron in the center, or both sides iron with steel in the center. We work both of the latter two methods every day, according as the stock may require to be used." It is evident therefore that composite sheets are being made more widely than is generally known.

Exhaust-Pipes and Nozzles.—The shape and size of the exhaust-pipe and the form of the nozzle exert a wonderfully great influence on the economical working of a locomotive. Yet, strangely enough, says the *National Car and Locomotive Builder*, there have been very few exhaustive tests made to demonstrate the relative value of different forms. Since the movement began to dispense with the diamond stack with its associates, the low double nozzle and petticoat pipe, the different railroads have been working into appliances to suit the open stack that are in most cases fairly efficient for maintaining draft and for passing out the steam without back pressure; but the work of identifying the most correct dimensions has been carried on in a hap-hazard way, and on not a few roads, through mistaken notions as to the functions of draft appliances, ex-

haust-pipes and nozzles are used that must cause great waste of fuel and steam. At the last Master Mechanics' Convention a committee was appointed to investigate the subject of Exhaust-Pipes and Nozzles. The committee consists of C. F. Thomas, of the East Tennessee, Virginia and Georgia; A. W. Gibbs, of the Richmond and Danville, and G. D. Harris, of the Mobile and Ohio. The mechanical officers of the first-mentioned roads have displayed unusual interest in the subject of proper proportions of exhaust-pipes and nozzles, and both companies have experimented at considerable length to ascertain the best forms. The experiments have been continued since the convention, and it is certain that by the time for making out the report to the association arrives a mass of original data will be collected that will make the report of high scientific value.

The Iowa Jobbers and the Railroad Commissioners.—The Iowa Railroad Commissioners filed an opinion on the complaint of Burlington and Davenport jobbers, charging conspiracy and discrimination against four leading Iowa railroads. They dismiss the charge of conspiracy and sustain that of discrimination, and issue an order re-enacting their schedule which the courts enjoined them from enforcing. The board says: "The evidence on the question of discrimination in Interstate rates against Iowa shippers develops a system of rates so unjust as to be a serious blow at the business prosperity of those thus engaged in the State. The low rates obtained by Iowa jobbers from the Eastern markets are neutralized by the high local rates within the State, so that the fifth-class rate in and the fourth-class rate out are largely in excess of the class from Chicago to Iowa points, and our dealers are placed at such a disadvantage as to destroy largely their profits and to seriously cripple their business; in fact, some of them declaring that unless relief comes in a reduction of high local rates they would be compelled to leave the State and go to where they could do business at a profit. In many instances the discriminations in rates in favor of Chicago merchants are 20 to 25 per cent., and representatives of Iowa business houses find themselves at such a disadvantage as to be unable to compete, unless at a sacrifice. The result is that our business interests in Iowa are languishing and the field is given up largely to Chicago dealers. What is true of the Iowa jobbing interests is largely the case in reference to the manufacturing interests of the State. From careful comparison of the rates and the testimony in this investigation the commissioners are of the opinion that a fair reduction of local rates within the State is the proper remedy for the protection of Iowa interests against the injustice they are subjected to from discriminating Interstate rates." The opinion is signed by Commissioners Smith and Campbell. The other commissioner, Mr. Dey, says he has been threatened by the jobbers in case he did not give his opinion before November 3, and so he declines to state his views until after the election.

The Calumet and Hecla Copper Company have bought the Metalline property at a price estimated at \$500,000 upward. It was offered to Tamarack for \$500,000, and Tamarack is believed to have wanted it, but, while it hesitated, Calumet bought the lot. It is considered a valuable acquisition, and already it is surmised that the company will now surely divide its property and organize a new company. That may happen, but does not necessarily follow. The new purchase embraces 40 acres, and lies between the Tamarack and Calumet and Hecla.

New Square Pipe Former.

A machine adapted for making square heater pipes, conductor pipe, boxes, cans, flashings, &c., has recently been placed upon the market by P. B. Calvert & Co., of Philadelphia, Pa. This machine, a general view of which is afforded by means of the accompanying illustration, is of such a character that in addition to being used in connection with a standard can be placed upon any work bench with equally satisfactory results. It is the invention of S. Y. Buckman. The machine is designed to bend iron as heavy as No. 24 gauge, 34 inches wide, and at any angle up to 90°. By means of this device we are informed that pipe 2 inches and larger in size may be formed into 30-inch lengths, perfectly straight and square. It is stated by the manufacturers that by the use of the gauge attachments all the bends can be made without first laying off the sheets. The machine is carefully constructed and its principal features are the

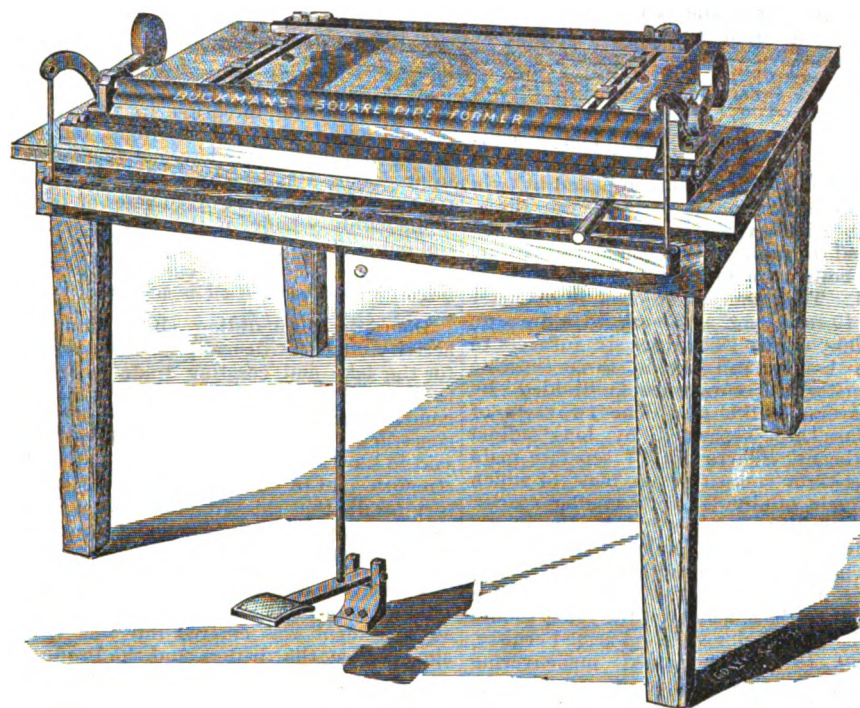
property immediately prior to the assignment, or on the ground that all or some of the preferences were bogus. Then there occurred a change in the manner of failing; and debtors resorted to confessions of judgment, which were invariably given for alleged borrowed money advanced by wives, brothers, fathers and even sometimes by mothers-in-law.

Under confessions of judgment, the sheriff would take possession of the stock of goods; and the only ready remedy for the merchandise creditors to pursue was replevin. But herein the creditors often showed as much dishonesty as the debtors, by claiming, under their writs of replevin, goods never sold by them, and which they had no moral right to take. These replevin proceedings often depleted the stock in the sheriff's hands to such an extent that very little was left to apply on the confessions of judgment, and again the debtor and his "confidentials" were foiled. But the system of giving preferences worked so much harm to the honest

debtor, and that radical changes should at once be made.

A lawyer who for the last ten years has made a specialty of commercial features, when questioned as to what changes ought to be made in the law in order that the creditor class should not suffer, suggested that the insolvency laws now existing in the New England States, which effectually prevent preferences and fraudulent disposition of assets, should be adopted here; that the books of the debtor should at once, upon the failure, be deposited with an officer appointed by the court, and if the books did not honestly account for all the assets the debtor should be deemed guilty of fraud, and imprisonment the same as for a misdemeanor should follow; that all modes of preference, either by confession, bill of sale, mortgage or assignment, should be abolished, and a creditor be at liberty, without first procuring a judgment, to bring an action to set aside and examine into all of the debtor's transfers made within one year of the failure; and, generally, that our criminal laws should be amended so that commercial fraud of all kinds could be dealt with as severely as crimes against the person and the public welfare. He said that imprisonment in Sing Sing of one fraudulent debtor would do more to check dishonest failures than all the civil remedies now on the statute books.

To illustrate the facility with which frauds of this class are committed, a single instance will suffice. A creditor, finding his debtor backward in his payments, called upon him, and was promised a settlement on the following day. He called the next day, and found that during the night the debtor's place of business had been destroyed by fire. Being assured by the debtor that there was sufficient insurance to pay all debts, the creditor, who was a director in several insurance companies, brought about an immediate settlement of the loss, and, upon learning that the fire-insurance companies had paid the debtor, called upon him once more and congratulated him upon being able to reopen his business. Incidentally the creditor asked for payment of his claim, and was stunned by the debtor telling him that he could not pay, and that "the money from the insurance belonged to his wife by her first husband." The enraged creditor then called the debtor all the bad names he could command, and the debtor, apparently unconcerned, replied that he hoped that after the business had been run in his wife's name for a few years he could make a settlement of 25 cents on the dollar, and that the creditor might then hear from him.



NEW SQUARE PIPE FORMER.

basis of patents which are now pending. The weight of the machine is only 75 pounds.

How Men Fall in New York.

The eminent writer on economics, Edward Atkinson, has said that "nine out of ten men who engage in business fail." If this is so, the question naturally presents itself: How do they do it? This question, which is of equal interest to creditors and failing debtors, is answered by a writer in the *Tribune* as follows:

After the Bankruptcy law was repealed, failing debtors could, under the law of this State, make preferences in general assignments to the full extent of their assets. As a consequence, there were very few assignments made which did not contain preferences that covered all the debtor's property; and general creditors, as a rule, received no dividends whatever. These preferences were largely given to relatives and friends for alleged borrowed money, and the merchandise creditor would invariably be told by the debtor that the "confidentials" had to be taken care of. After awhile the merchants began to attack such assignments, and many were set aside for fraud in the disposition of

creditor class, that last year the Legislature passed a law allowing preferences in general assignments only to the extent of one-third of the actual assets; and since then it has been a serious question whether confessions of judgment or any other mode of preference beyond the statutory limit can be valid. For this reason the failures that have taken place since the enactment of the anti-preference law have been characterized by the grossest fraud, and the rule is that when a failure is publicly announced the stock of goods has disappeared, and to-day it is a common occurrence for debtors to owe upward of \$50,000 for merchandise bought within four months of the time of failure, and yet to not have on hand \$2000 of merchandise. A clothing dealer failed on Broadway a fortnight ago, owing \$40,000 to different merchants; and not a single dollar's worth of goods was found on hand. This fraud was so palpable that the debtor fled to Canada to avoid criminal warrant for his arrest. A recent canvass among the wholesale woolen merchants in the dry goods district disclosed the astonishing fact that they have not averaged a dividend of 15 cents on the dollar out of their bad debts for the last ten years; and they all complain that the laws and present decisions of the courts of this State

The Boston *Herald* presents a table showing the advance in 12 copper properties in which Boston is interested since January 1, present prices being taken rather than the highest price.

	Points advance.	Amount advance.
Allouez.....	37½	\$310,000
Atlantic.....	5½	235,000
Boston and Montana....	31	3,100,000
Calumet and Hecla.....	120	12,000,000
Central.....	2	40,000
Franklin.....	3	120,000
Huron.....	2	80,000
Kearsarge.....	8	400,000
National.....	61½	260,000
Pewabic.....	2½	105,000
Quincy.....	26½	1,060,000
Tamarack.....	56	2,800,000

Total 12 stocks.....\$20,510,000
One stock, Osceola, is omitted, because there has been almost no change in the value of its share capital.

During the first seven months of the present year the exports of Chili have reached \$7,000,000 more than during the same period of last year.

THE WEEK.

A strike in the Australian coal mines, which has rendered useless a large amount of ocean tonnage, on account of the dearth of fuel, has at last terminated. This event is expected to have an appreciable influence in reducing rates of freight, which, of late, have reached exorbitant figures.

The Westinghouse Electric Company, of Pittsburgh, have been awarded the contract for a central station plant in the city of London, England. The contract calls for 25,000 16-candle power incandescent lamps, and is much larger than any contract previously obtained by this company.

Copper mining in Mexico, stimulated by increased prices for ingot metal, is at present very active, and a belief is expressed that the output can easily be increase tenfold.

The rate in New York for the present year is \$2.22 per \$100 on real estate. Tax Commissioner Coleman believes that it will not exceed \$2.20 next year. In Brooklyn the rate is \$2.72, against \$2.76 last year.

Another substitute for jute bagging has been found in the interior bark of the cotton plant, which is readily and easily decorticated, and can be manufactured into bagging and cloth for bags by the machinery used in the jute mills.

The United States Consul at Tahiti reports to the Department of State that the new tariff for that island has been vetoed, which action renews the old 13 per cent. tariff.

Of the total arrival of vessels at this port from foreign countries during October, numbering 455, only 117 were American, against 233 British. The number of vessels in port is 408, of which 57 are steamships and 50 ships.

The report of the Lighthouse Board recommends an appropriation of \$3,107,310 for new aids to navigation, and of \$2,292,50 for the lighthouse establishment. Among the special appropriations asked for the next fiscal year are: Sandy Hook light vessel, \$60,000; sea wall at Staten Island lighthouse depot, \$40,000; Statue of Liberty building pedestal, \$50,000.

The Governor of Washington Territory estimates the population of the Territory at 167,982, an increase of about 24,000 during the year. The taxable property of the Territory is valued at \$84,621,182, which is a gain of over \$65,000,000 in the last ten years.

The steamer Haytien Republic, which has been seized on a charge of attempting to run the blockade with arms and men on board, is owned by B. C. Morris & Co. and others, of Boston, and was built for the Haytien trade at an expense of \$100,000. Mr. Morris is positive that the boat had nothing in her cargo when she left New York that would warrant her detention or seizure. An American warship will be despatched to Hayti without delay.

The German Government proposes to resume the building of large ironclads, which was stopped after the wreck of the Grosser Kurfurst. A bill providing a credit for the building of eight ironclads will be sent to the Reichstag.

The law of 1887 requiring that railroad companies that run 50 miles or more within New York State shall do away with stoves for heating passenger cars went into effect 1st inst. At the Grand Central Depot it was announced that the law was being observed and that before long not a stove would be in use. "During the past year,"

it was said, "the New York Central officials in the passenger equipment department have been actively employed in testing various devices for heating cars by means of steam obtained direct from the locomotive, and have decided on a system combining simplicity of construction and management with the most satisfactory results. A 2-inch iron steam-pipe runs under each of the cars, connection between the cars being made with a metallic joint and a sleeve. This main pipe connects with a system of pipes inside each car, one running lengthwise of the car, with branch pipes extending under the seats. At the center of each of the interior pipes is a key by which the steam from the main pipes can be cut off, thus reducing the temperature of a single car without interfering with that of cars more distant from the locomotive, which is the source of the steam supply. Since the advent of autumn all the cars composing the trains known as the New York, Chicago and St. Louis vestibule limited and the New York, Chicago, Cincinnati and St. Louis fast express, besides a large number of the local trains running on the various parts of the road, have been successfully heated by this means."

The new Inman Line steamship, City of Paris, sister ship to the City of New York, was successfully launched. The vessel is in every respect identical with the City of New York. She will be propelled by twin screws. The engines are of the three-crank triple-expansion type, and are designed to indicate 18,000 horse-power. The boilers are nine in number, built of steel. They are each 15½ feet in diameter and 19 feet long, and work to a pressure of 150 pounds. There are six furnaces to each boiler, and are in three separate water-tight compartments, divided by transverse bulkheads. The two sets of engines are separated by longitudinal bulkheads. There are 15 separate main water-tight compartments, most of which are again subdivided into smaller spaces. The auxiliary engines number in all 37. Hydraulic power is employed to work the steering gear. The rudder is a specialty, being a patent of the firm's and adds greatly to the efficiency of the vessel should she be commissioned as an armed cruiser, owing to the improved maneuvering power. In this connection it may be stated that the vessel's decks have been specially strengthened for carrying guns, so that in all respects she will make an efficient armed cruiser.

The *Financial Chronicle* publishes a summary cabled from England of Mr. Ellison's annual cotton review, giving information as to the extent of European cotton consumption. The returns show that European spinners took 3,055,000,000 pounds of cotton during the year from October 1, 1887, to October 1, 1888, compared to 2,932,000,000 pounds in 1886-87 and 2,847,000,000 pounds in 1885-86. The increase was evenly divided between the Continent and Great Britain. The European stocks on October 1, 1888, are computed at 245,000 bales, compared to 218,000 bales in 1887 and 221,000 in 1886. Mr. Ellison estimates that to maintain last year's rate of consumption an American crop of 7,100,000 bales will be needed. The European demand for 1888-89 he estimates at 7,488,000 bales, compared to 7,277,000 during the past year, and of this amount 4,670,000 bales should be drawn from America.

Business houses that have dealings with commercial agencies will be interested in a case against Bradstreet's decided last week in Philadelphia by Judge Gordon. Crew, Levick & Co., oil merchants, sued the Bradstreet Company to recover damages for alleged untrue information furnished them. The plaintiffs had asked

the agency to give them a report of the Union Refining and Mfg. Company, of New Jersey, and they reported that the company had a paid-up capital of \$600,000 and were in good credit. On the strength of this Crew, Levick & Co. gave them credit for the amount of \$1500, which they have never been able to collect. It was alleged that the Union Refining Company were insolvent at the time the report was furnished. The judge, on a motion for a non-suit, granted it, on the ground that the contract was as if between two private people, the defendant corporation being a private and not a public one, and that Crew, Levick & Co., in signing their contract with them, had waived the right to recover on the ground which they are now striving to get a verdict. He said that if they could have proved willful or malicious negligence the circumstances would have been different.

In his annual report General Benet, Chief of Ordnance, says that the bureau expended \$1,507,382 during the last fiscal year, and that 41,130 rifles and carbines were manufactured at the national armory. Investigations have been completed relative to the determination of the charge, projectile, rifling, &c., for an arm of smaller caliber than the present service piece. It is the intention to use compressed and perforated cartridges, but as yet the powder makers have not succeeded in producing a satisfactory powder. The report says that a tract of 70 acres of land immediately outside of the city limits of Columbia, Tenn., has been selected for an arsenal, and the work of construction will begin as soon as the title is accepted.

Domestic shipbuilding shows unusual activity, and the demand for new vessels for the lake and coasting trade promises to be well sustained for a long time to come. The iron and steel vessels recently constructed for service on the lakes are said to have shown unexpected speed and strength, and to have given such satisfactory results that this superior type of vessel is likely to be most in demand throughout the next building season.

To prevent excessive production in the Pennsylvania oil fields and to sustain prices an agreement was entered into one year ago between the drillers and the Producers' Association to shut down until November 15, when another contract will be considered, with similar objects. Meanwhile the oil drillers are striking new wells in expectation of enlarging their operations.

The Interstate Commerce Commission has called upon all subsidized railroad and telegraph companies to report, as required by act of August 7, 1888, whether they are maintaining and operating telegraph lines for the use of the Government or the public for commercial and other purposes without discrimination, and whether they have made and continued such arrangements for the interchange of business with any telegraph company.

Wooden shipbuilding in the Maine yards has taken a fresh start. Ten square-rigged vessels will be built during the coming winter, besides a large number of schooners. It is announced that Arthur Sewall has made the New England Shipbuilding Company a proposition to the effect that if they will put in a plant and build an iron ship he will take a half interest in the vessel.

A cataract comparable to Niagara Falls is said to have been discovered in Colorado, and there are "several more counties to be heard from" in that great State.

Claus Spreckels' beet-sugar factory in California is running night and day, and the results are so favorable that several other refineries will probably be established.

MANUFACTURING

Iron and Steel.

Harry Darlington, a brewer and capitalist of Pittsburgh, has just leased the plant of the Elba Iron and Bolt Company, Limited, in that city, and will put it in operation as soon as the necessary repairs can be made. Between 400 and 500 men, who have been idle since the works were closed down in January last, will be given employment. The plant of the Elba Iron and Bolt Company, Limited, was operated in connection with the Continental Tube Works by a number of prominent business men and manufacturers of Pittsburgh. It is stated that the profits from the Elba plant were entirely satisfactory, but the pipe trade was considerably depressed and money was lost by the Continental Tube Company. This led to financial embarrassment, which resulted in the closing of the two plants last January. The Elba plant was built in 1862, and has 28 single puddling furnaces, 6 heating furnaces, and 4 trains of rolls (one 8-inch; one 10-inch; one 18-inch, and one muck train) and had an annual capacity of 26,000 tons of skelp iron.

It is reported that the Pittsburgh and Lake Erie Railroad Company are endeavoring to purchase the Clinton Rolling Mill, at Pittsburgh, formerly operated by Graff, Bennett & Co. If the purchase is consummated the mill will not be closed down as a consequence, but the entire plant will be transferred to the works on the upper side of Carson street.

From the Hubbard (Ohio) *Enterprise*, of the 24th inst., we take the following: "A meeting of those interested in the building of a sheet mill in Hubbard was held at the bank Tuesday afternoon, and the outlook for a plant is decidedly rosy. Hubbard will furnish \$15,000 of the capital stock, and the balance will be put in by Mr. Ward and a party of practical mechanics. Should the mill be erected it will likely be run on the co-operative plan, and a dozen of the employees will be stockholders in the establishment to the extent of \$1000 each."

James McNeil & Bro., proprietors of the Vulcan Tank and Boiler Works, at Pittsburgh, have a contract for making gas pipes for the Philadelphia Natural Gas Company which measure 36 inches in diameter, and are made from what is known as heavy plate iron, used for making tanks for boilers. Each connection of pipe is 40 feet long, and at each end it is connected together by an expansion link. Six hundred feet of this size have already been made.

A statement was recently published in the Pittsburgh papers to the effect that the Carbon Iron Company, of that city, of which Horace W. Lash is general superintendent, had made some important changes in their process for the manufacture of steel, by which the product was greatly increased and the cost of manufacture considerably reduced. We find that the statement contains very little truth. The company have always used more or less coke in their process and expect to continue its use. The firm are gradually improving their methods for the manufacture of steel, and expect to turn out a steel the strong point of which will be a superior quality.

The two charcoal blast furnaces of the Jackson Iron Company, at Fayette, Mich., are to be closed down during the coming winter. This step is made necessary by the scarcity of fuel within easy hauling distance of the furnaces, which have been in operation for many years, and have used the charcoal made from the timber cut

from the lands of the company for a radius of 10 or 12 miles from the furnace. The cost of preparing and hauling the charcoal has at last grown so great that iron cannot be made there at any profit during the winter, and for that reason the furnaces will be closed down in a short time. The charcoal kilns will be kept at work during the winter, and the furnaces will probably be put in blast again in the spring.

On Wednesday, the 24th ult., the Allentown Iron Works, of Allentown, Pa., blew in No. 1 Furnace, and on the 26th ult. No. 5 Furnace was blown out for repairs. The latter stack will be relined and put in blast as soon as possible. This firm have three blast furnaces, Nos. 1, 4 and 5, No. 1 being the only stack in operation at present.

We are informed that the report that the Bellaire Nail Works, of Bellaire, Ohio, had recently introduced a new system of making steel by which they were enabled to dispense with the services of 40 men is without foundation.

The Blakeney Foundry Company, of Springfield, Ohio, have recently made an addition to their foundry, 100 x 50 feet, which has almost doubled its capacity. The firm employ 85 men, and report plenty of orders on hand. The firm manufacture principally castings for railroad work, and are at present engaged in a large order for Chicago cable roads. About 30 tons per day are being produced, of which 20 tons are for these cable roads.

The blast furnace of the Wheeling Iron and Nail Company, of Wheeling, W. Va., which has been idle for some time undergoing repairs, has resumed operations. The repairs and improvements of the furnace have been thorough; three of the four hot-blasts were torn away, and two new ones with increased capacity were erected, which are expected to add to the output of the furnace.

About 700 men will be employed in the converting and blooming departments of the new Bessemer steel works now in course of erection by the Allegheny Bessemer Steel Company, at Duquesne, Pa. The employees in the last-named department will be very few, as the entire mill will be operated by machinery. There will be only one man at each train of rolls. He will control the "piece" or bloom by means of hydraulic levers, thus dispensing with the service of a large number of employees who are required in other rail mills. The converting mill cost \$300,000, while the rail and blooming plants cost \$600,000, making the entire cost of the works \$900,000. The company at the commencement will have to purchase all the pig metal used from outsiders, but it is the intention to erect two blast furnaces close to the rail mill. It requires the product of two furnaces to keep the mills supplied. The work on this improvement will likely be commenced in the early spring.

Machinery.

The Reliance Gauge Company, of Cleveland, report rapidly growing demands for their safety water columns from all parts of the country. Among the orders recently booked are 32 for the Reading Iron Works, of Philadelphia, Pa., 10 for the California Electric Light Company, of San Francisco, 6 from Australia and 3 from the City of Mexico. Among the large concerns who have recently adopted these safeguards are the Whiteman Paper Mills, of Danville, N. Y., and the Fall Mountain Paper Company, who are placing them in their several mills, located in Vermont, New Hampshire and Massachusetts.

The Laidlaw & Dunn Company, of Cincinnati, Ohio, have carried off a number of medals at the centennial exposition, one of

them being for their well-known standard Duplex steam pump.

Messrs. Lodge, Davis & Co., Cincinnati, Ohio, report under date of 1st inst., large orders for tools and machinery for the Long & Allstatter Company, of Hamilton, Ohio; the Missouri Pacific Railway Company, St. Louis, Mo.; the East End Gas Works, Cincinnati, Ohio; the Hoffman Machine Company, Detroit, Mich., and the Eagle Iron Works, Detroit, Mich. Two carloads of machinery were sent to San Francisco last week.

The Hill Clutch Works, of Cleveland, Ohio, have opened a branch office at Kansas City, Mo., at 1221 Union avenue, under the management of Mr. A. M. Morse, who has for years been engaged in that section in engineering and machinery business. They now have branch offices in New York, Chicago, Minneapolis and Kansas City, with general office at Cleveland. They have just contracted to put in a complete outfit of power transmission machinery according to their designs for the New Bedford Gas Company, Massachusetts, and are also making extensive additions to their own works. The Niles Tool Works, of Hamilton, Ohio, have orders now in hand for them for one 10-foot boring and turning mill, also for a 5-foot mill.

Boys, Porter & Co., Limited, proprietors of the Connellsville Foundry and Machine Shop, at Connellsville, Pa., report plenty of orders on hand. They have recently made large shipments of machinery to Southern and Western points. An enlargement of the plant in the near future is contemplated.

George Westinghouse, Jr., of Pittsburgh, has purchased almost the entire capital stock of the Waterhouse Electric and Mfg. Company, of Hartford, Conn. This gives the Pittsburgh company a large interest in the arc light business, as the Hartford company have now over 3000 lights in use.

The Davenport Foundry and Machine Company, of Davenport, Iowa, write us as follows: "We are quite busy in our works and are getting out ten fly-wheels 14 feet diameter, weighing each about 18,000 pounds; ten large disk cranks and couplings, &c., for the Davenport Water Company; also a large lot of castings for the Hawkeye Electric Mfg. Company, who are locating here. They will have their works in operation December 1. Beside this we have 12 engines under way and a lot of job work."

The Machinists' Supply Company, of Chicago, Ill., have just issued their catalogue No. 2, devoted, as the name of the company implies, to machinists' tools and supplies such as are now in use in general shop practice. It embraces nearly 800 pages, and is illustrated throughout, brief descriptions also being given and tables of sizes and prices added. We have no doubt that it will prove very useful to those for whom it is specially intended.

Hardware.

The Hartman Mfg. Company, of Beaver Falls, Pa., are shipping large invoices of wire mats to foreign countries.

The Scotford Mfg. Company, of Kenosha, Wis., have begun the erection of buildings for the purpose of manufacturing brass novelty goods. They will introduce the latest and most approved machinery for this purpose.

The Kenosha Mfg. Company have been organized with a capital of \$40,000, and will erect a plant near that of the Scotford, above mentioned. G. M. Simmons is president; James Cavanagh, vice-president, and William W. Strong, secretary. They will put up two buildings and will manufacture brass utensils and novelties.

E. T. Barnum, Detroit, Mich., is filling a large order for ornamental wire and iron-work going to Sydney, Australia. This foreign trade, we are advised, has been for a long time an important part of his business, his goods being well known in the colonies.

About August 1 the Findlay Rolling Mill Company, Findlay, Ohio, purchased the plant of the Stirling Chain Company, of Cuyahoga Falls, Ohio, and removed it to Findlay, where they are operating a rolling mill for the purpose of making a uniform high quality of iron such as they require for the manufacture of axes, hatchets, adzes, mattocks, picks, grub hoes and chain. They now have their plant in active operation, working 34 fires on coil and cable chains $\frac{1}{4}$ to 2 inch. Their building is 150 x 35 feet, with additions of 16 x 20 for engine and boiler room and 20 x 46 for link room. Their entire plant is operated with natural gas as fuel, which, they advise us, enables them to make unusually clear and perfect welds. Their capacity in the chain department is 10 to 12 tons per day.

The Gate City Stone Filter Company, have, as usual, an extensive exhibit this year at the American Institute Fair. Their space is near the right-hand corner of the main hall, and is one of the first the visitor comes upon when entering the building. The goods of this company are very generally known and hardly anything more is necessary to be said than that they show their Filters and Coolers in all styles and finishes. From the very plainest Filter to the most ornamental style of porcelain, all grades, sizes and styles are exhibited.

The J. H. Pocock Can Company, Second street and Frankhn avenue, St. Louis, Mo., write us that they have just completed the purchase of 50 feet of ground adjoining their present site on the north, and have made all arrangements for erecting a new building next spring, with a frontage of 125 feet on Second street, four stories high, and running east to Waddingham street, depth of 150 feet. The new building will be equipped with the latest improved machinery, turning out work promptly and satisfactorily.

One of the first exhibits to strike the visitor at the American Institute Fair is that of L. H. Mace & Co., 111-117 East Houston street, New York, manufacturers of Refrigerators, Meat Safes, Wooden Ware, &c. The exhibit occupies a space on the left-hand side of the entrance to the hall and covers considerable ground. The various goods manufactured by Messrs. Mace & Co., are effectively distributed, and the visitor has opportunity to inspect the different styles, sizes and finishes of Refrigerators made by this concern, in addition to the other goods. A circular, specially gotten up for the fair, is distributed.

The Prescott Hardware and Mfg. Company, of Chicago, a new corporation, in which Kellogg, Johnson & Bliss, the well-known hardware dealers, of Chicago, are interested, have succeeded to the business of the Prescott Mfg. Company, of Boston, manufacturers of the Prescott patent trackless sliding door hangers for house and barn doors. These hangers have been upon the market for a number of years, and have been widely introduced throughout the country. The company's plant will be removed to Chicago after the stock now on hand is worked up. The Prescott Hardware and Mfg. Company, of Chicago, will manufacture other hardware specialties after their factory is under way in Chicago. Mathias & Knapp, Western agents of the old company, will manage the business of the new one. The trade may send all

orders to the company's main office, 108-110 Randolph street, Chicago, or to the various local agents of the old company, whose contracts have been assumed by the new company.

Growth of the Marine Engine.

In a paper on "The First Century of the Marine Engine," recently read before the British Institution of Naval Architects, Prof. Henry Dyer follows the development of the engine in a very interesting manner. We extract from it the following:

For the first 20 years after the establishment of ocean navigation the side lever engine was employed almost entirely in the larger mail packet companies, and was essentially Watt's engine, modified in some details. The Americans used, and to a large extent still use, the ordinary beam engine for paddle steamers, but in Britain, in order to economize space and keep the center of gravity of the engines low, they were inverted and thus became what were called side-lever engines. Some of them were magnificent specimens of architecture, but engines of this type were by no means self-contained, the keelsons and framing of the vessels being largely relied upon for resisting the stresses arising from the action of the engines, and of course under such conditions a low pressure of steam and uniformity of motion were matters essential to their safe working. The pressure of steam was generally from 3 to 5 pounds and seldom exceeded 10 pounds on the square inch above the atmosphere, while the space occupied in the hull by the engines and boilers was nearly one-third of the ship's length. No trustworthy figures can be found to show the consumption of coal, but for the period mentioned it was seldom less than 7 pounds per I H.P. per hour. In a few cases horizontal engines were placed between the paddle-wheels, but these were objectionable on account of the weight they caused to be placed on the deck. To obviate this difficulty the steeple engine was designed by David Napier, and continued to be used for many years, especially by river steamers. It is now, however, seldom made, the direct-acting diagonal or the oscillating engine—which was first designed by Penn, in 1837—being generally employed for paddle steamers.

When the screw propeller was introduced, chiefly through the exertions of Mr. F. P. Smith and Bennett Woodcroft in this country and Captain Ericsson in America, the same kind of engine was used for driving it as was employed for paddle vessels, the connection between the crank and the propeller shafts being effected by means of gearing. The first British steamer of any size fitted with a screw propeller was the *Archimedes*, 237 tons, and built on the Thames in 1839. It was tested under Admiralty supervision, between Dover and Calais, with the fastest paddle-wheel mail packet on the station, and so satisfactory were the results that the Admiralty felt justified in introducing the screw propeller into the Royal Navy, and they led to the construction of the *Rattler*, which was launched from Sheerness Dockyard in April, 1843. The *Rattler* proving satisfactory, several other screw vessels were built for the Navy. In the merchant service, also, the screw propeller made slow progress. The *Great Britain*, built in 1843, was the largest vessel of that day, and was remarkable not only for her size, but also because she was built of iron and was propelled by a screw instead of paddles. She was 322 feet over all in length, 48.2 feet in breadth and 31.5 feet in depth, with a gross tonnage of 3270. She was built at Bristol from the designs of Brunel, her engines were made by J.

Penn & Sons, Greenwich; her boilers by Fawcett, Preston & Co., Liverpool, and her engines were secured to the propeller shaft. The *Great Britain* made her first trip across to New York in 15 days, and afterward for many years was well known on the Australian trade. As screw propulsion became more common gearing was gradually dispensed with and the direct-acting inverted or horizontal engines were used. These may be looked upon as the normal type of engines for the larger vessels employed in the merchant service and the Navy respectively.

For a considerable time after the establishment of ocean steamship trade little attention was paid to the direct economy of fuel, although various causes, such as the improved form of the hulls, the use of iron in their construction, and the introduction of the screw propeller, led to a greater tonnage being propelled with the same amount of coal. There seemed to be a very general belief that high-pressure steam was not only unnecessary, but was positively a disadvantage and a danger. Gradually, however, this opinion changed as the necessity arose for extending trade to foreign countries where coal could not be readily obtained, and the pressure of the steam was gradually increased, although in many cases this seems to have been brought about in consequence of greater confidence in the materials of construction than from a distinct knowledge of the principles involved. Among those who led the way in the design and construction of engines of a more economical type the names of John Elder, Charles Randolph, and John M. Rowan deserve to be specially mentioned among Clyde engineers.

On the trial trip, and during many years' subsequent service, the consumption of coal in these steamers was from 24 pounds to 3 pounds per indicated horse-power per hour—a degree of economy never before realized in marine engines, amounting as it did to a saving of from 30 to 40 per cent. of the coal previously burned by steamers of the same class. This success induced the company to have their whole fleet fitted with engines of the same type, as to them the question of coal economy was of vital importance, owing to the great cost of sending coal to the Pacific stations. The next set of engines made for the company was of exactly the same size, and was worked with the same pressure as the engines of the *Valparaiso*, but with the difference that they were steam-jacketed all over, instead of merely at the ends, and the result was that the indicated power rose from being under 900 to 1150 horse-power—a result which shows the advantage of the steam-jacket if used under proper conditions. For a good many years, however, little progress was made by the compound engine, except with the company who had introduced it. Some others had compound engines made by various makers, but bad design prevented them from being as successful as they ought to have been, and in a few cases they were taken out and replaced by single-cylinder engines. Moreover, the engines of the *Woolf* type, designed by Randolph & Elder, were not fitted to give the highest efficiency, and it was not till the "receiver" type of engine, with cranks at right angles, was introduced by Nicholson and brought prominently before the public by E. A. Cowper, that the compound marine engine became almost universal in the merchant service. Until about 1868 or 1870 the inverted direct-acting two-cylinder simple engine held the place in the mercantile marine formerly occupied by the side-lever engine. At these dates, however, the paddle-wheel had been almost entirely superseded by the screw in the propulsion of ocean-going steamers.

The Iron Age

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The result of the election will be received with satisfaction by the majority of the readers of *The Iron Age*, because it puts at rest for a long time to come a question which has been eagerly discussed during the past few months. Protectionists will feel that the victory won was not dearly bought at the cost of the temporary suspension of business and the halt in all markets for some time past. The contest has educated a very large number of our citizens on the main issue, and has made business men and the workers familiar with many facts which have strengthened their position on the tariff. No one will doubt that in the future they will be able to grapple far more intelligently and therefore more successfully with questions affecting the business interests of the country. It has broadened their views and extended their knowledge. These are achievements which should not be valued lightly. The community will at once return to the active prosecution of its daily work. We look to an almost immediate quickening of the pulses of commerce. We know that in the fields which *The Iron Age* watches closely a very large amount of business has been in abeyance. Buyers and sellers alike have hesitated for months, although it was acknowledged that with the exception of a few lines the features of the situation warranted a brighter future. When the political excitement began to run high the advancing tendency witnessed during the summer was lost, and the markets have been stationary for two months at least. A thorough search for the causes of this halt failed to develop any other than that named. Now that it is removed, the only reason for doubting is out of the way, and the trade looks forward to a bright future.

The Outlook in the Steel Trade.

The most striking phenomenon in the steel trade during the current year has been the constant decline in steel rails coupled with an advance in the raw materials. The statistics for the first half of the current year showed that the consumption of foundry and mill pig gained slightly over that of last year, the production having been 1,806,792 gross tons for the first six months of 1887, against 1,841,584 tons for the corresponding period this year. We know that since then there has been a notable improvement. We know, furthermore, that there is coupled with this a very important fact, the rapid growth of the use of steel for other purposes than rails. Add to this the no less significant circumstance that we imported far less raw material this year than we did in 1887. Roughly, we made 400,000 gross tons of Bessemer pig less in the first six months of 1888 than in 1887, but, on the other hand, we imported

142,000 tons less of pig iron. Probably not less than 100,000 tons of this was Bessemer pig. We imported 275,000 tons less of iron ore. Let it be assumed that the two represent together about 425,000 tons of iron ore mined at home instead of abroad. Now, the falling off of 400,000 tons of domestic Bessemer pig produced would represent a decline of the demand upon our mines of say, 650,000 tons. As shown above, lessened imports compensate for 425,000 tons thereof, leaving only, roughly, 225,000 tons less of domestic ore called for by our furnaces.

Let us regard the matter in another light. It is true that the production of rails fell off from 1,023,320 tons during the first half of 1887 to 692,197 gross tons for the first six months of 1888, a decline of 331,123 gross tons. These are the figures of Mr. James M. Swank which include all the mills. Those of the Board of Control of the Rail Association stood, for shipments, 907,351 tons and 585,558 tons, a decline of 321,793 tons. The last data up to October 1st are: Shipments in 1887, 1,390,825 tons; in 1888, 921,363 tons, a falling off of 469,462 gross tons. It is, therefore, safe to say that up to October 1st the quantity of rails produced had declined by 475,000 tons. This is sure to be swelled to 600,000 tons by the end of the year; but we imported 137,500 gross tons of rails last year, while this year we shall import not more than 67,500 tons, leaving the deficit 530,000 to 550,000 tons. To offset this we must note that the imports of steel blooms, slabs and billets are not likely to be more than 100,000 tons, if it does reach that figure, as compared with 310,000 tons last year. This would leave a deficit of about 300,000 tons of steel, considering the lessened imports of wire rods, &c. Against this quantity we must write off the increased amounts of steel going into nails, shapes, plates, &c., not affected at all by the cessation of imports of the cruder materials.

It will be seen that it would be very dangerous to draw direct conclusions from the condition of the rail trade upon that of the raw materials entering into it. They have been relatively benefited more from a restriction of imports of iron ore, pig iron and crude steel. That particular part of the ore producers and pig-iron manufacturers marketing material suitable for Bessemer purposes may find the demand from other quarters grow to such dimensions that they will be relatively independent of the rail manufacturers. The dominating influence of the latter may be less prominent. It will not take a very great development of the demand for barb wire, nails, plates and shapes to bring orders enough to the Lake mines and the other Bessemer ore producing districts to crowd them up to the record of 1887, and above it. The unexpectedly favorable result this year, so far as tonnage is concerned, was due to the very circumstances to which we refer. It is therefore not beyond the possibilities that we may have a very active demand for Bessemer ores for 1889, in spite of a slack year for rails. In other words, it is a contingency which the trade should keep in view, that ores and freights might be advancing in spite of a stationary market for steel rails.

The opinion is often expressed in trade circles that if the next were only a normal year for rails, say with a mileage of 8000

to 9000 miles, the demand thus created, added to that already existing outside of railroad circles, would cause a very rapid rise in values. There is nothing to hinder it so far as the foreign markets go. They are moving along in a satisfactory way independently of us. Besides, freights all over the world are high, so that thus an additional feature is added to the security of our position.

The Ericsson Submarine Torpedo Gun.

Now that so much attention is centered in the building up of a new United States navy and in the development of appliances of modern destructive warfare, it is not without interest to trace the history of some inventions in this line which have been made in recent years, but which, so far as is known, have never been given much opportunity to practically demonstrate the claims of superiority made for them. Some of them, it is true, have been so manifestly absurd as to make more than a brief examination of them a waste of time, while others have contained the germs of practically successful machines, and still others, from the start, commended themselves as appliances which promised immediate success, but which, from a variety of causes, have been allowed to remain unused. Perhaps the most striking example of this is to be found in the submarine torpedo gun of the veteran engineer, Captain Ericsson. The merits of this weapon have, at different times, been demonstrated in the boat Destroyer, built by Captain Ericsson himself, and it seems strange that no provision was made long ago for its use in our navy. Favorable action by Congress, so far as the adoption of the plans of the Destroyer were concerned, would have not only secured a formidable means of offense and defense, but would have been but a just tribute to its illustrious designer.

No doubt there are some of our readers who recall the fact that some two or three years ago one of Captain Ericsson's submarine guns was built at the Delamater Iron Works, at New York, for the English Government. We watched it in its different stages of construction, and witnessed some of the tests before shipment. Since then nothing has been said of it. English papers chronicled its safe arrival in England and referred to the test firing to which it was to be subjected; but that was all. It may, therefore, be of interest to say now that through injudicious management on the part of the English Board of Officers, the explosive charge of one of the projectiles, after a few shots had been fired, became ignited before the projectile had cleared the gun. Its destruction completely put an end to all further experiments. Since that time, so far as we know, nothing further has been done with it. Through a peculiar coincidence the accident occurred at about the time that Congress was considering the advisability of building a number of vessels of the Destroyer type, a circumstance, which though little known has not unnaturally suggested the possibility of some connection between the unfortunate result of the blundering English trials and the failure of Congress to provide for the acceptance of Captain Ericsson's plans. Be that as it may, the gun, in our opinion, still stands unrivaled as a

means of torpedo discharge, and has, moreover, been warmly advocated by many prominent authorities, among them Admiral Porter. Further effort should be made to bring it into service.

The World's Production of Pig Iron and Steel.

We have recently been in receipt of several inquiries on the relative production of iron and steel in this country and abroad. As our readers generally will be interested in the statistics on this subject, we present herewith the most authentic figures which have been issued by Government officials and trade organizations in the leading countries of the world. In the production of pig iron Great Britain retains the lead over all competitors, although she is now being closely pressed by the United States. Germany is third in the list, but far below the two leaders. France is fourth. Belgium is fifth, but there is little difference between her and Austria-Hungary, the sixth. Russia is seventh, and Sweden eighth; these two countries being also neck and neck. Spain is the only other country whose pig iron statistics are worth separate enumeration. All other countries of the world, it is estimated by statisticians, do not together produce over 200,000 tons of pig iron annually. Taking the highest known production of each country, we have the following table in gross and metric tons, according to the system of weights adopted as the standard in the countries specified:

Maximum Pig Iron Product.

Countries.	Years.	Tons.
Great Britain.....	1882	8,586,680
United States.....	1887	6,417,148
Germany.....	1887	3,907,364
France.....	1883	2,069,430
Belgium.....	1883	783,433
Austria-Hungary.....	1884	734,346
Russia.....	1882	498,400
Sweden.....	1885	464,737
Spain.....	1885	150,225
Other countries.....		200,000

The aggregate of 23,820,763 tons is the utmost production of pig iron of which the united countries of the world have as yet shown themselves capable. Of that production Great Britain's share was 36 per cent., and that of the United States was 27 per cent. Comparing the figures of the other countries it will be found that the United States produced as much as Germany, France and Russia combined. Great Britain, however, is not keeping up her heavy output of 1882, her production having declined steadily from that year until 1886, when she produced but 6,870,665 tons, or only 453,517 tons more than the output of the United States in 1887. She rallied in 1887 to 7,441,927 tons, which is still far below the figures of 1882. Taking the actual production of each country in a given year the American Iron and Steel Association gives the world's production of pig iron as follows from 1800:

Year.	Tons.	Year.	Tons.
1800....	825,000	1880.....	17,950,000
1830.....	1,825,000	1885.....	19,100,000
1850.....	4,750,000	1886.....	20,385,571
1870.....	11,900,000	1887.....	22,170,919

In the production of steel the United States leads the world, having surpassed Great Britain in 1887. All kinds of steel are included in this comparison, the basis of which is crude steel or ingots, and not finished forms, statistics of which would

be impossible to collect. According to the American Iron and Steel Association, the following table embodies the latest authentic reports from each country, gross and metric tons being used according to the custom of the country specified:

Country.	Year.	Tons.
United States.....	1887	3,339,071
Great Britain.....	1887	3,170,507
Germany.....	1889	1,685,400
France.....	1887	440,956
Austria-Hungary.....	1887	276,920
Russia.....	1882	235,140
Belgium.....	1887	206,350
Sweden.....	1886	78,231
Spain.....	1886	25,000
Italy.....	1886	23,760
Other countries.....	....	35,000
Total.....		9,506,335

The United States produced 35 per cent. of this aggregate and Great Britain's share was 33 per cent. These two countries are thus closely matched in the production of steel, while Germany, third in order, falls very far behind, but is still a long distance ahead of France, which ranks fourth. In the production of Bessemer steel rails, a finished form of some of the steel included in the above table, the United States far surpasses any other country, having rolled 2,101,904 tons in 1887, against 1,021,847 tons rolled by Great Britain in the same year. This comparison gives the greatest annual production ever achieved by the United States, but Great Britain's heaviest year for steel rails was 1882, when she rolled 1,235,785 tons. As no other country makes as many rails as Great Britain, these statistics amply establish the supremacy of the United States in the steel-rail manufacture.

It would be of much interest to note the comparative standing of the various countries of the world in respect of other forms of iron and steel than those enumerated, but the figures are wanting for everything except rolled iron. In 1887 the United States turned out 2,311,160 tons of iron rolled in plates, sheets, bars, &c., while Great Britain rolled but 1,701,312 tons of puddled iron in the same forms. In castings and other miscellaneous iron products the United States undoubtedly leads, as cast iron is used here for a great many more purposes than abroad. The statistics showing the consumption of pig iron in the several countries would go far toward establishing the correctness of this statement, but into that phase of the subject we will not now enter, although from such a standpoint the United States would be incontestably proved to be the leading iron country of the world.

In his paper on "The Distribution of Internal Friction of Engines," presented two weeks ago before the American Society of Mechanical Engineers, Professor Thurston, among other sources of loss of power from friction, referred naturally to the friction of the piston and its rod. He characterized it as a decidedly variable fraction, varying not only with the class of engine, but also in the same engine when differently handled. It is not surprising that this should be so, especially when we consider the large variety of packings and packing rings with which the market is supplied, and the uncertain measure of tightness and protection against leakage afforded in the person of the average attendant. It has been remarked, facetiously, perhaps, but not wholly without foundation, that the first thing which

a new engineer will do with an engine is to set out the packing rings, and that similarly the one unfailing remedy for any slight trouble with an engine is the same setting out of these rings. That the friction of a piston should be enormously increased by such tinkering with an engine is but natural, and instances are not unknown where machinery had become almost inoperative from this cause, the friction from unduly screwed-down stuffing-boxes, moreover, adding to the difficulty. Under the circumstances the unpacked pistons and rods which are now gradually coming into use are to be welcomed as important advances in engine construction.

The World's Vessel Tonnage.

A few years since Lloyds' Register succeeded in collecting in the *Universal Register* reliable statistics of shipping for the entire world. Although not absolutely complete, they are so nearly correct that they may be used without hesitation as the basis of deductions relating to business interests. To the particular trades in which we are interested, the tonnage of the world, as affecting ocean freights, is a matter of direct and often vital importance. During the last few months those who are dependent upon foreign markets for a whole or a part of their supplies of raw material have heard a good deal of rising freights. It has come largely in the nature of a surprise to many, and the points affecting the supply of tonnage do not appear to be generally understood. The figures gathered by the authority alluded to furnish some cue to the rapid change from unremunerative rates to relatively high freights.

The total tonnage of all seagoing vessels for all countries of the world was 21,507,856 tons in 1885. It declined to 20,943,650 tons in 1886, and underwent a further diminution to 20,765,645 tons in 1887, the number of craft being in the three years in the order named: 35,408 in 1885, 35,124 in 1886, and 33,200 in 1887, all vessels under 100 tons net register being excluded. Roughly speaking, the tonnage is divided equally between sail and steam, the decline being due entirely to the decadence of sailing marine. It declined from 11,216,665 tons for 25,766 vessels to 10,402,807 tons for 25,155 vessels in 1886, and to 9,820,492 tons for 23,310 ships in 1887. So far as the steamer fleet of the world is concerned, new construction has done little more than filling the gaps caused by losses. In 1885 9642 steamers had a tonnage of 10,491,241 tons. In the next year the totals foot up 9969 steamers with a tonnage of 10,531,703. In 1887 the number declined to 9890, but the tonnage rose to 10,918,153 tons.

With such a steady falling off going on in the conveying capacity of the world's merchant marine the sudden raising of rates was not surprising as soon as anything like a fair amount of goods began to move. The shipyards of Great Britain have already responded to a sudden influx of orders for new tonnage, and the steel mills have felt its quickening influence. Good authorities are beginning to question whether the new tonnage on the stocks will not be fully adequate to bring down freights to a more reasonable level. For

the moment vessel owners are making money, after a long spell of unremunerative business.

Our own country has not changed its position much in the ranks of the ship-owning nations of the world. Taking the leading nations, the figures stand as follows:

	<i>Sailing Vessels.</i>		
	No. of vessels, 1885.	No. of vessels, 1886.	No. of vessels, 1887.
Unit'd Kingdom Colonies.....	5,114	4,881	4,112
	2,767	2,559	2,402
Total.....	7,881	7,440	6,514
United States...	3,542	3,427	3,242
Norway.....	3,969	3,200	3,010
Germany.....	1,794	1,678	1,485
Italy.....	1,674	1,679	1,508
Sweden.....	1,130	1,079	1,036
France.....	1,194	1,082	998
Greece.....	1,251	859	845
Russia.....	981	944	1,001
	Tonnage, 1885.	Tonnage, 1886.	Tonnage, 1887.
Unit'd Kingdom Colonies.....	3,248,807	2,846,148	2,658,518
	1,376,662	1,097,147	1,039,562
Total.....	4,625,469	3,943,295	3,698,080
United States...	1,587,140	1,530,490	1,442,113
Norway.....	1,351,986	1,305,337	1,284,892
Germany.....	806,197	769,977	727,975
Italy.....	705,383	712,857	619,946
Sweden.....	331,061	312,821	297,282
France.....	318,712	286,696	264,186
Greece.....	289,385	209,525	209,456
Russia.....	270,940	271,849	284,889

The position is not so very bad in the case of sailing vessels, but it is pitiable when comparing our steamer tonnage with that of other ship-owning nations:

	<i>Steamers of Leading Nations, Number:</i>		
	1885.	1886.	1887.
United Kingdom Colonies.....	5,020	5,057	4,979
	692	785	796
Total.....	5,712	5,792	5,715
France.....	508	509	481
Germany.....	559	579	601
United States...	388	400	398
Spain.....	401	401	380
Italy.....	153	173	192

	<i>Steamers of Leading Nations, Tonnage:</i>		
	1885.	1886.	1887.
United Kingdom Colonies.....	6,162,117	6,169,065	6,468,936
	377,506	426,806	394,579
Total.....	6,539,623	6,595,871	6,863,515
France.....	738,141	742,662	731,732
Germany.....	603,917	654,814	659,660
United States...	495,862	508,677	505,977
Spain.....	361,006	356,912	388,074
Italy.....	195,905	230,342	265,513

It will be observed that there has been but little change in the relative position of the leading ship-owning countries of the world.

Car-Building and the Bar Iron Trade.

The car famine in the West is now beginning to bear fruit in the shape of increasing orders for new freight cars which are being placed among the car-builders. The more prominent railroad companies have led off with orders for 1000 to 1500 cars, and small lines are purchasing from 100 to 500 cars each. As car-building improves, greater activity is perceptible in auxiliary branches of industry, including some departments of the iron trade. A single inquiry recently in the market called for 2000 car axles, and this is regarded as merely the beginning of a heavy demand which will crowd the axle forges with work this winter. The car-wheel foundries will also be correspondingly active, which will be a welcome change from their condition of dullness the past summer. As a standard freight car requires about 2 tons of bar iron for its construction, it will be seen that the rolling mills will also participate heavily

in the benefits accruing from activity among the car-builders. Orders from this source will come at a good time to sustain the bar iron market, but if they should expand to very considerable proportions they will not only keep prices firm but may also cause an advance.

The Western bar mills are now making deliveries on fairly good time, showing that they are catching up with their booked orders, but throughout September and October complaints of their derelictions in this respect were numerous. Jobbers' stocks in Chicago were drawn on by the larger consumers to a considerable extent, because they could not get sufficiently prompt deliveries from the mills. Even now the large Chicago warehouses are very short of certain sizes which have been in urgent demand, and it will take some time to restore stocks to their normal condition, with the mills as busy as they are on contract work. An unprecedented quantity of bar iron is now going into agricultural implements, and the general country demand is most excellent, so that the deficiency in the consumption of bar iron by railroad repair shops has been almost unnoticed. The effect of car orders for bar iron will thus be more immediately felt than if a large part of the bar mill capacity was unemployed.

American Enterprise in Chili.

The recovery of Chili from the prostration of a destructive war has been so rapid and so substantial that already the Government finds itself with a surplus of \$20,000,000 in the treasury and prepared to engage in grand schemes for internal improvement. American engineers have been in the country since last May, carefully surveying the most feasible routes for railway construction, with the design of bringing the elevated tablelands of the interior into close communication with ports on the seacoast, and thus opening the way for an indefinite expansion of foreign commerce. The latest advices show that the Government has acted favorably upon the proposition by voting the entire amount required by the estimates of expenditure, the President confirming the act by affixing his signature to the bill. A feature in the transaction that possesses special significance when viewed from the American standpoint, and one that may reasonably be regarded with peculiar satisfaction by citizens of the United States, is the fact that American contractors were successful in securing the prize, despite the fierce competition of rivals in Europe. The amount involved is no less than \$35,000,000 or upward, no inconsiderable portion of which will be distributed among our various industrial establishments in the purchase of bridge-work, locomotives and rolling stock, it being expressly stipulated by the contractors, who are the well-known firm of Comeys & Lewis, associated with the Union Bridge Company, that these all must be supplied by manufacturers in the United States. Apart, however, from considerations of a merely pecuniary nature, there is reason for complacency in the assurance, tacitly conveyed, that henceforth the international relations of the two countries concerned must become more cordial and more intimate, thus aiding in the development of an American sentiment in distinction from

a policy purely European, and which, under certain supposable circumstances, might become arrogant and aggressive on this Western Hemisphere.

Chili has an auspicious future. Her inhabitants have not inaptly been called the "Yankees of South America." Having now an established Government and a restored national credit, and having extended its territory down to Terra del Fuego, embracing what was formerly known as Patagonia—altogether a shore line of 2270 miles—at the same time spreading eastward to the boundaries of the Argentine Republic, she seemed only to need a complete system of railway communication between the interior and the seaboard to insure a development of resources rich, varied and abundant. What the renowned American contractor, Mr. Meiggs, sought to do for Peru in her prosperous days, the rising Republic of Chili proposes to secure in her own behalf through similar instrumentalities.

The Blast Furnaces on November 1.

Again the West and South show a notable increase in the quantity of pig iron being currently made, the indications pointing to further growth. As the figures given below show, the anthracite furnaces have practically remained stationary:

Anthracite Furnaces November 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	28	10	2,919	18	3,896
New Jersey.....	14	4	1,450	10	3,080
Spiegel.....	3	3	233	0	0
Pennsylvania:					
Lehigh Valley...	46	26	9,456	20	4,680
Spiegel.....	1	1	57	0	0
Schuylkill Valley...	35	19	6,468	16	3,040
U. S. Susquehanna Valley.....	18	9	2,851	9	1,630
Lebanon Valley...	15	12	5,984	3	1,508
L. S. Susquehanna Valley.....	23	11	4,218	12	3,468
Total.....	181	95	38,345	86	21,262

For a year past our records show the following:

	Furnaces in blast.	Capacity per week.
November 1.....	95	38,645
October 1.....	96	39,728
September 1.....	92	35,541
August 1.....	93	35,397
July 1.....	92	35,478
June 1.....	96	38,418
May 1.....	96	37,003
April 1.....	94	36,416
March 1.....	98	37,588
February 1.....	97	36,989
January 1.....	118	38,206
December 1, 1887.....	122	39,487
November 1.....	124	40,028
October 1.....	123	39,440
September 1.....	125	38,338
August 1.....	129	37,930
July 1.....	128	40,742

What changes there have been among the anthracite furnaces have practically compensated for one another. In New York one of the Port Henry furnaces, No. 3, has gone out for repairs. In New Jersey Musconetcong which was blown in lately is making more iron by 23 to 50 tons per week than in any previous campaign, producing 555 tons in one week. The Schuylkill Valley is turning iron out more heavily. Edge Hill and Lucinda are at work, and Montgomery, Mount Laurel and Norway will be added in November. In the Lehigh Valley Lehigh Furnace resumed. The two Saucon furnaces of the Thomas Iron Company have been put on magnetic ores, and are making mill iron altogether. In the Upper Susquehanna Union was about to blow in early in the month. In the Lebanon Valley one of the

Bird Coleman furnaces is out for repairs, Lochiel is idle. In the Lower Susquehanna Valley the Pennsylvania Steel Company have blown out in one of their furnaces. The probabilities point to a slightly increased make for the anthracite furnaces during the current month.

A very important increase in the capacity at work has taken place in the coke furnaces, the figures showing the following:

The Coke Furnaces November 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week. Gross tons.	Number out of blast.	Capacity per week. Gross tons.
New York.....	3	1	932	2	1,832
Pennsylvania:					
Pittsburgh district.....	19	18	19,254	1	700
Speigel.....	1	1	336	0	0
Shenango Valley.....	10	14	9,363	5	2,545
Juniata and Conemaugh Valley.....	20	10	6,005	10	3,340
Speigel.....	2	1	438	1	200
Youghiogheny Valley.....	5	4	1,651	1	600
Miscellaneous.....	3	3	1,543	0	0
Maryland.....	2	1	250	1	120
West Virginia.....	6	4	2,334	2	400
Ohio:					
Mahoning Valley.....	14	11	8,603	3	2,140
Central and Northern.....	17	14	9,870	3	1,310
Hocking Valley.....	14	5	1,530	9	1,980
Hanging Rock.....	11	7	1,620	4	863
Indiana.....	2	1	222	1	200
Illinois.....	13	9	10,505	4	3,030
Michigan.....	1	0	0	1	250
Wisconsin.....	4	2	1,056	2	1,362
Missouri.....	6	1	488	5	2,130
Colorado.....	1	1	465	0	0
The South:					
Virginia.....	11	8	3,675	3	1,853
Kentucky.....	4	4	997	0	0
Alabama.....	20	16	8,533	4	1,900
Tennessee.....	11	9	4,225	2	800
Georgia.....	2	1	501	1	259
Total.....	201	146	94,696	65	27,904

	No. of furnaces.	Capacity per week.
November 1, 1888.....	146	94,696
October 1.....	137	85,461
September 1.....	133	81,082
August 1.....	122	74,856
July 1.....	121	69,543
June 1.....	128	75,427
May 1.....	130	75,815
April 1.....	128	70,644
March 1.....	128	68,892
February 1.....	130	73,912
January 1, 1888.....	143	83,101
December 1, 1887.....	144	88,835
November 1.....	151	90,459
October 1.....	152	89,123

The increase in the capacity blowing is due primarily to added plant in the South, to a greater number running elsewhere and to heavy product, notably in the Mahoning Valley.

Every furnace except one is now in operation in Allegheny County, the exception referred to being the Soho, which will go in this month. During October Edith and Lucy No. 2 went into blast. In the Shenango Valley the product has been heavy, on the whole, and practically the district is working close up to full capacity. The same is true of the Allegheny and Youghiogheny valleys, and of those furnaces which we group among the miscellaneous. Centre having resumed on the 20th ult. On the Juniata and Conemaugh, the only fact worthy of notice is that the Cambria Iron Company have resumed the manufacture of spiegeleisen, though not at the East Conemaugh furnace. In West Virginia Top Mill is again producing. In the Mahoning Valley the output has been very heavy, aggregating 38,649 tons, against 34,829 tons in September. Nearly every furnace in the valley has done better than its average. Anna, Grace, Girard, Hazelton, Hubbard and Mary notably so. Anna averaged 907½ tons for three consecutive weeks, consuming only 2116 pounds of coke to the gross ton of metal, an excellent result for its limited facilities. Mary made the exceptional record of turning out No. 1 Ohio Scotch to the extent of 92½ per cent. A number of producers note specially the active and strong condition of the market. Andrews & Hitchcock write that the de-

mand for foundry iron is so urgent that if they had bought ore for two furnaces they would blow in their second Hubbard, as they find it impossible to supply the wants of all their customers. The reports from Central and Northern Ohio similarly indicate a heavy production and a good demand. No. 2 Cherry Valley is to begin work in a few days. In the Hocking Valley one of the Floodwood furnaces is to blow in soon, otherwise there have been no changes, minor changes only have taken place in the Hanging Rock region.

In Illinois North Chicago is now running four stacks, but, on the other hand, No. 2 Union went out on the 8th ult. In Wisconsin Mayville blew in, while in Missouri one of the Missouri Company's furnaces went out, the other being blown in soon after.

No changes have taken place in Kentucky or Georgia. In Virginia, Lynchburg is to blow in on the 10th, the furnace having been remodeled. In Alabama, however, Gadsden, "B" Sheffield and Birmingham, and one of the North Birmingham (Sloss) blew in, and No. 2 Sloss resumed on the 4th ult. In Tennessee Citico is doing heavy work, and Nashville is running on coke. One Rockwood and one South Pittsburg are the only idle furnaces. Returns from the charcoal furnaces received thus far indicate that there have been only minor changes.

Corliss Valve Gearing.

Speaking of some water-works engines recently built by Messrs. E. P. Allis, of Milwaukee, Wis., *Industry*, a San Francisco journal says:

We do not indorse the Corliss valves used on the Milwaukee engines. These involve a lot of link and pin work, dash pots and other contrivance that might be dispensed with in the case of a slow-moving engine working against a uniform load. In San Francisco practice the Corliss valve gearing has been kept in its most simple form, and is in some degree, or in the same degree, better than when new detail is added. Messrs. Hicks, Hargreave & Co., of Bolton, England, for example, have in their attempts to improve or modify Corliss gear, provided apparatus that reminds one of a Jaquard loom. We are not among those who deem the Corliss system of valve gearing essential parts of a good engine. The intended functions are well performed and the valves are durable. Of this there is no doubt, but the actuating mechanism is extensive and "trappy."

The *Railway Age* says: "While few of the principal railroad companies have been doing much new building, still work has been quietly in progress on hundreds of short lines all over the land, and already new track has been laid this year in every one of the 47 States and Territories, with the exception of Rhode Island, Utah and Nevada, and almost 6000 miles of main line have been added to the railway system of the country since January 1 last. During the first ten months in the year main line tracks were laid in 44 States and Territories on 280 lines to the aggregate of 2430 miles in the four months since our last statement. Although comparatively little grading is done in the greater part of this country after November 1, still the last two months of the year are always marked by a very considerable amount of track laying, and this will be the case this year, especially if the weather continues favorable. Of the 280 lines here reported upon at least 75 are still in process of construction, while some track will be laid on a few other roads. Looking the field over we venture to estimate that from 1200 to 2000 miles more of new track

will be added to complete the record of last year, making the total new railway mileage of 1888 between 7000 and 8000 miles."

Propulsion of Ships by Air Propellers.

At the last meeting of the British Association for the Advancement of Science, a paper was read by Mr. H. C. Vogt, suggesting the propulsion of ships by means of revolving sails acting in the air. The advantage to be gained over the ordinary form of screw propulsion were summed up as follows:

(1) A saving amounting in engine power by eliminating the disturbing action of the screw; (2) the form of the ship could be determined with reference to least resistance and seaworthiness only, and the division in water-tight compartments could be complete; (3) the change in trim will be less disadvantageous when the power is applied above the deck than below the center of gravity; (4) the vibrations caused by the screw propeller, which are destructive to the ship and most unpleasant to those on board, will be avoided; (5) the proposed air propeller will utilize the natural wind power.

The air propeller, as explained by Mr. Vogt, is, in its outer shape, somewhat similar to the ordinary water screw, with sails or blades made of thin sheet steel, having the greatest width near the circumference. The pitch of the blades is capable of being varied in order to utilize the power of the wind, because nearly 80 per cent. of the winds, the whole compass round, augment the thrust of the propellers.

In order to avoid vibrations, the blades of water propellers are tapered toward the tips or near the circumference, whereas the blades or sails of the air propeller should be broadest near the circumference, because the air, being elastic, causes no vibrations. It is found in practice that for equal numbers of revolutions, equal intensity of thrust, engine power and speed, the area of an air propeller should be about twelve times that of the water screw, but this ratio decreases somewhat as the size of the ship increases.

On Friday, the 2d inst., the freight rates from Pittsburgh to Galveston and Houston, Tex., were advanced. Iron nuts, bolts, washers, rivets and staples were advanced from 54 to 56 cents per 100 pounds. The new class rates are: First-class, \$1.50; second, \$1.25; third, \$1.05; fourth, 86 cents; fifth, 78 cents; class A, 83 cents; B, 75 cents; C, 67 cents; D, 55 cents; E, 50 cents. They were formerly, \$1.50, \$1.25, \$1.05, 86 cents, 82 cents, 74 cents, 67 cents, 55 cents and 50 cents. The new figures are issued under a new classification, revised for Texas business.

The Durant Crescent route has sent out its Tariff Sheet No. 9, on rates of pig iron from Southern furnaces. By a printer's error, the first sheet sent out was wrong, and a second corrected one has been issued.

The Canadian Geological Survey, in its annual report on the mineral and metal production of the Dominion for the year 1887, estimates an output of the year at \$15,000,000. Of the aggregate exports, estimated to have been about one-third of the total product, the United States was the purchaser of 78 per cent., while England took the next largest share, 15 per cent., and Newfoundland, Germany, Sandwich Islands, Australia, Argentine and the East and West Indies followed in the order given.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington street, CHICAGO, November 5, 1888.

Business has been very decidedly curtailed during the past week, the impending political struggle absorbing the attention of all classes.

Pig Iron.—The market generally has been very dull, the only sales of consequence reported having resulted from the closing of negotiations begun some time since. Among these is a lot of several hundred tons of Lake Superior Charcoal which goes to the East to be manufactured into Car Wheels and malleable Castings. The other sales were of Coke Irons to the foundry trade. A large number of consumers have stated that they would defer purchases until after election unless positive bargains were offered them. But just now bargains in Pig Iron are extremely rare, although reports are more frequent of concessions being offered on Southern Irons, particularly Gray Forge. It is asserted that any weakness in that direction is only for early delivery, and that contracts to be filled in 1889 would not be made on the same basis. The scarcity of high numbers of Lake Superior Charcoals still continues, as the furnaces are turning out a smaller proportion of those grades than usual. The Calumet Furnace is now ready to be blown in, all the repairs having been completed. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$20 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband), No. 1, \$20. @ \$21.; other Ohio Soft Irons, No. 1, \$17 @ \$18; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$18; No. 3, \$16 @ \$17; Southern Coke, No. 1 Foundry, \$17.50; No. 2 Foundry and No. 1 Soft, \$17; No. 3 Foundry and No. 2 Soft, \$16.25; Gray Forge, \$15.50.

Bar Iron.—As work among the car-builders increases the demand for Bar Iron improves from that source. A few good specifications made their appearance last week and much larger orders are shortly expected. Bids on Car Iron range from 1.70¢ to 1.75¢, flat, f.o.b. Chicago. The carload price for Common Iron from mill is 1.75¢, half extras, f.o.b. Chicago, but large lots and good specifications could be placed a little lower, depending on the condition of the mill quoting. As the mills generally seem to have plenty of work, no break in prices is indicated, but, on the contrary, a firmer feeling is noticeable with the increasing business in sight. Jobbers quote small lots from store at 1.90¢ @ 2¢, according to quantity and quality, but their stocks have been badly broken of late, and some of the largest warehouses in the city are at present unable to supply a complete assortment of sizes.

Structural Iron.—Business in this line has been very quiet. Mill orders run as follows, f.o.b. Chicago: Angles, 2.20¢ @ 2.25¢; Universal Plates, 2.25¢; Tees, 2.55¢ @ 2.65¢; Beams and Channels, 3.40¢. Small lots from store are quoted at the following rates: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—A fair business has been done by the local merchants, but it was mainly confined to small lots. Some large enterprises are on foot involving the consumption of considerable quantities of Plates, and the outlook is decidedly encouraging. Prices are firm, quotations from store

continuing as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 ¢ off.

Sheet Iron.—The mills are quoting slightly lower prices, as they begin to see daylight through their orders, and 3¢ at mill for No. 27 is now named by most of them, although few are prepared to make early deliveries as yet. Jobbers are having a light demand, which is attributable to the very mild weather recently prevailing. A cold snap is badly needed to impart activity to the retail Stove trade, from which their demand comes. They quote small lots of No. 24 at 3.20¢, Nos. 25 and 26 at 3.30¢, and No. 27 at 3.40¢, with concessions to best buyers.

Galvanized Iron.—New business has again fallen off among manufacturers' agents, but the mills are still far behind with their orders, and stocks in warehouses are very badly broken. Small lots are quoted at 60 ¢ and 5 ¢ off for Juniata, and 80 ¢ and 10 ¢ off for Charcoal.

Merchant Steel.—Small lots of Open-Hearth Spring Steel are being sold at 2.70¢, but no large transactions have taken place in it. The demand for other forms of Steel has been quiet and association prices are as follows: Bessemer Bars, 2.80¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Orders for 20,000 to 30,000 tons were placed among the local mills during the week, the greater part being for next year's delivery. More inquiries are in the market, but they are of such a character that some members of the trade fail to derive much encouragement from them, and are not looking forward to a year of any greater activity than the present one has been. It is very certain that prices will be decidedly less remunerative. In view of this some makers are disinclined to compete vigorously for business, believing that those who do not fill their order books now will get better rates next spring or summer. The nominal quotation is still \$30 for all deliveries.

Old Rails and Wheels.—Sellers of Old Rails are more plentiful than buyers just now, and prices are lower. A small lot, consisting of a few carloads, was sold at \$22.50, and several hundred tons were sold at the same price in the interior of the State. On other lots offered the best bids received were equivalent to about \$21.75, Chicago, which the sellers rejected, believing that a better demand will be experienced later in the season. The supply is understood to be quite heavy, but holders assert their ability to wait for better prices. Old Car-Wheels are evidently being sold to consumers direct by the railroad companies, very few of them passing through the hands of third parties. Prices are, therefore, difficult to quote, but they are worth \$19.50 @ \$20.

Scrap.—An inactive condition of the market is reported, very few sales having been made. Most of the mills and forges are well supplied with stock. City dealers are holding off for higher prices, which they expect to get after snow falls, if indeed a demand does not spring up after the election. Mixed Country Scrap is quoted at \$14.50 @ \$15. Selling prices of carefully selected Scrap are as follows, per ton of 2000 lb: No. 1 Forge, or Railroad Shop, \$20.50 @ \$21; Track Scrap, \$19.50; Horseshoes, \$20; Axles, \$26.50; No. 1 Mill, \$15.50 @ \$16.50; Pipes and Tank, \$12 @ \$13; Light Wrought, \$11; Cast Machinery, \$15; Stove Plate, \$12; Cast Borings, \$9.50; Wrought Turnings, \$12 @ \$12.50; Axle

Turnings, \$14; Coil and Leaf Steel, \$17; Locomotive Tires, \$15.50.

Hardware.—Wholesale merchants have experienced an excellent demand for Shelf Hardware. The very healthy condition of this branch of trade is shown by the large number of mail orders now being received, as they are much more numerous than usual. The election will naturally curtail business to some extent this week, but as soon as it is over it is expected that a resumption of the activity will occur and that it will continue up to at least the middle of December. In Heavy Hardware a quieter feeling prevails, purchases being made very conservatively and collections being less satisfactory than earlier in the fall. No material changes in prices are reported.

Nails.—A 10,000-keg order for Steel Nails from a point further West excited some interest in the local trade the past week, but generally speaking manufacturers' agents did little or no business. They quote \$1.90, f.o.b. Chicago, but concessions on this price are being offered by some sellers, and the impression prevails that a lower range of values will be established which will probably hasten the consummation of the long-contemplated combination. Small lots are sold, from store, at \$2.05, but this is shaded to best buyers. The continuance of mild weather has benefited the jobbing trade in Nails, as outdoor work is being prosecuted with vigor much later in the season than usual. Prices of Wire Nails are much firmer than those of Cut Nails, small lots selling at \$2.60.

Barb Wire.—Jobbers report an improvement in the demand, but no change in prices, continuing to quote small lots at 2.90¢ for Painted, and 3.60¢ @ 3.65¢ for Galvanized.

Pig Lead.—Prices have fluctuated within a narrow range during the week, between 3.70¢ and 3.80¢ but considerable quantities have changed hands, being taken directly for consumption. Refiners are indisposed to push sales at the lower figures, and the market, therefore, appears firm.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St. PHILADELPHIA, Pa., November 6, 1888.

Business has been very quiet since date of our last report, but in view of the important election which will be decided within the next 24 hours, it could hardly be otherwise. Important transactions have been held in abeyance, both sides being satisfied to wait until the question is decided. Prices, however, have not weakened in the slightest, from which it is inferred that they might have been dearer if the usual demand had not been interfered with.

Pig Iron.—The feeling has been one of much steadiness, and makers have had no difficulty in disposing of all the Iron they could spare. In most cases prices have been maintained, while in some instances slight advances have been paid in order to secure certain brands or deliveries. But there is no quotable change anywhere, and for all practical purposes the market is just about as it was a week ago, although the firmness of holders leads to the opinion that it has more inherent strength than was generally expected. Sales of Foundry Irons have been chiefly in lots of 50 to 100 tons each, and ordinarily at prices ranging from \$17 to \$17.50 for No. 2 and \$18.50 to \$19 for No. 1, the bulk of the business being at the outside figures. Mill Irons have not been called for to any great extent, as they are usually taken in larger lots, thus making it more an object for buyers to see the result of the election before closing their

contracts. There have been a good many inquiries, however, and there is reason to believe that the demand will be large enough to absorb all the Iron that can be turned out during the balance of the year. For the present, therefore, prices are not likely to go below \$16 nor higher than \$16.50 @ \$17 at tide, a little one way or a little the other, according to developments during the next 24 hours. The market looks remarkably healthy and sellers appear to have entire confidence in values as above quoted.

Blooms.—There is a fair demand at quoted rates, which are unchanged, as follows: Nail Slabs, \$29 @ \$29.50, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 $\frac{3}{4}$ "bloom" ton of 2464 lb.; Foreign at tide, c.i.f., duty paid, \$30 @ \$31 for Nail Slabs; \$34 @ \$36 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—The demand has been quite strong up to this date and prices fully maintained. Quotations vary according to point of delivery, quality of Bars, &c., but \$29 @ \$30, f.o.b. cars at mill, seems to fairly cover both ends of the market. The volume of business has not been large, as the offerings were light and quotations very firm.

Bar Iron.—The demand has not been equal to that met with during the earlier portion of last month, although there is still a good deal of activity, especially at the city mills. Some outside concerns seem to be anxious for new business, to secure which they have manifested a little weakness in making quotations, giving buyers better terms than were expected a little while back. There may be a reaction, however, in course of a few days. For the present, at all events, there is nothing to indicate serious dullness, and the chances are that things will go in a few days as if there had been nothing whatever to divert attention from the ordinary routine of business. Prices, as we have said, are irregular, and in some instances have shown signs of weakness, but ordinarily 1.85¢ @ 1.95¢ is quoted, with concessions of possibly half a tenth or a tenth when the order was large or desirable as to specification of sizes, &c. Skelp Iron is steady but not active. Mills are full of work for some weeks, and buyers have not felt inclined to pay over 1.9¢ for new business, although 1.95¢ to 2¢ is asked.

Plate and Tank Iron.—There are no new features to notice in this department. Small orders have been numerous, and mills are nearly all busy on work of this class. Work that was somewhat confidently expected from the shipyards has not materialized yet, and it is not unlikely that there may be further delay, as regards at least one important contract; but, under any circumstances, there will be a fair degree of activity, as most of the yards are tolerably well filled up for the winter months. Prices are unchanged, as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—There is not much new business coming in at present, and some of the mills are beginning to complain of dullness in many of their departments. The outlook is not specially encouraging at present, although it is hoped that things will take a fresh start soon. Prices unchanged, as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel

Sheet Iron.—The demand has been very satisfactory and prices firmly maintained. Mills are taxed to their utmost capacity to keep up their assortment of sizes, and stocks in first hands are at an extremely low point. Quotations for best makes are about as follows:

Best Refined, Nos. 26, 27 and 28.... 3½¢ @ 3½¢
Best Refined, Nos. 18 to 25.... 3¢ @ 3½¢
Common, ½¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28.... 4½¢ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25.... 4¢ @ 4½¢
Best Bloom Sheets, Nos. 18 to 21.... 3½¢ @ 3½¢
Blue Annealed..... 2.8¢ @ 3¢
Best Bloom, Galvanized, discount..... 62½¢
Common, discount..... 67½¢

Merchant Steel.—The demand is well maintained at prices as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—There is a good deal of inquiry for Rails, and it is not unlikely that some important contracts will be closed, providing that the election is favorable. Both sides have been waiting. As regards consumption, the outlook is not encouraging, but in view of the very low prices quoted, and the comparatively high cost of production, it is quite likely that sellers will stand out for more money. Quotations are, at the moment, more or less nominal, \$28.50 at mill being an inside figure for large lots, and from that to \$29 for smaller orders.

Old Rails.—There is very little business to report in spot lots, buyers and sellers still being unable to come together. T's in store or for shipment are held at \$24, with buyers at from \$23 to \$28.50. Sales of spot lots have been made at \$24.75 for old English Trams, \$25 for American Streets, and \$24.50 @ \$25.50 for T's delivered at mills in the interior.

Scrap Iron.—The demand is well maintained, and sales are chiefly at about the prices quoted a week ago—viz.: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Nails.—The demand has been somewhat more active, and, while prices are still irregular and unsatisfactory, the feeling seems to be somewhat more hopeful. Lots from store are quoted at from \$1.90 to \$2, but (some brands) carload lots are quoted at extremely low figures for spot cash.

Wrought-Iron Pipe.—The demand is fully maintained, mills are all busy and likely to be for the balance of the year. Discounts as follows: Black Butt-Welded, 52½¢; Galvanized do., 52½¢; Black Lap-Welded, 62½¢; Galvanized do., 52½¢; Boiler Tubes, 60¢.

Geo. W. Schultz, formerly with Sites, Wheeler & Co., and later with J. C. Poulter & Co., has taken an office at 36 South Seventh street, Philadelphia, and embarked in the general Iron and Steel brokerage business as E. W. Schultz & Co. Mr. Schultz is also treasurer of the Electrical Construction Company, which concern makes a specialty of installing electric light plants and all kinds of electrical supply and repair work.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
Pittsburgh, November 7, 1888.

Business continues in a generally satisfactory condition, although it has been curtailed somewhat of late by the excitement incident to the national election.

Pig Iron.—The quietude noted for some weeks past continues, and the indications are that the market will rule steady during the remainder of the present year. Consumption continues large, but so is production, and the best-informed authorities predict that there will be no falling off in trade for some time to come, as the reports from nearly all points in this respect are of a most favorable character. Furnacemen would like to have a higher price for their product, but consumers aver that they are paying more now than they are warranted in doing, claiming that the raw material is bringing a higher price relatively than the finished product. There is scarcely a furnace in this district but is well sold up, some of them for several months ahead; but it is well to bear in mind, on the other hand, that many consumers have anticipated future wants and are out of the market, so that the one offsets the other. Prices have undergone but little change for several weeks, with the exception of Bessemer, which is off 50¢ per ton. We quote as follows:

Neutral Gray Forge.....	\$16.00 @ \$16.25,	cash.
All Ore Mill.....	16.75 @ 17.00,	"
White and Mottled.....	15.00 @ 15.50,	"
No. 1 Foundry.....	18.00 @ 18.50,	"
No. 2 Foundry.....	17.00 @ 17.50,	"
No. 3 Foundry.....	16.25 @ 16.50,	"
No. 1 Charcoal Foundry.....	24.00 @ 24.50,	"
No. 2 Charcoal Foundry.....	21.00 @ 22.00,	"
Mill Charcoal.....	19.00 @ 20.00,	"
Bessemer Iron.....	17.50 @ 18.00,	"

Ferromanganese.—Sales of 80 % Ferromanganese at \$56 @ \$57, and 20 % Spiegel at \$27 @ \$28.50, cash.

Muck Bar.—There is more inquiry, and with but little offering the market is firmer and higher; we now quote at \$29 @ \$29.50, cash. A broker reports having an order to buy a lot of 1000 tons at \$29.25, cash, without having been able to get it. The above quotations show an advance of from 50¢ to \$1 per ton within a few weeks. It appears that nearly all the mills making a specialty of Muck to sell are sold ahead.

Manufactured Iron.—There is a continued good degree of activity, and the indications are that the mills, generally, will have about all they can do until the close of the present year. Prices remain unchanged. Bars, 1.80¢ @ 1.85¢; Plate 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢; all 60 days, 2¢ off for cash; Skelp Iron, 1.80¢ @ 1.85¢ for Grooved, and 2.10¢ @ 2.12½¢ for Sheared. Trade in Skelp Iron usually commences to drop off this month.

Nails.—Are still quoted at \$1.90, 60 days, 2¢ off for cash, although it is alleged that Wheeling, and possibly some other points west of Pittsburgh, are cutting the card rates. Pittsburgh makers refuse to cut below card rates, which at best, they claim, offer but a very small margin for profit.

Wrought-Iron Pipe.—There is a falling off in new business, as there usually is at this season of the year, but the mills are still busy and likely to be the rest of this month. No change in prices. Discounts on Black Butt-Welded Pipe, 52½¢; on Galvanized do., 45¢; on Black Lap-Welded, 62½¢; on Galvanized, 52½¢; Boiler Tubes, 60¢; 2-inch Tubing, 13¢ @ foot, net; 5½-inch Casing, 40¢ @ foot.

Old Rails.—There is a fair demand, but no quotable change in prices; sale of 500 tons, at \$24.75, and 2000 tons, at \$25.25. Standard American Tees may be fairly quoted at \$25 @ \$25.25. As soon as the winter season sets in the work of lifting will be suspended, and this leads to the belief that there will be a stronger market in the near future, although no immediate advance in price is looked for.

Steel Rails.—We continue to quote Heavy Sections at \$28 @ \$28.50, cash, at mill. We are cognizant of a sale at \$28.25. Some of the railroads have been

buying considerable sized lots, giving Old Iron Rails in part, on a basis of \$28.25 @ \$28.50 for New Steel and \$25 @ 25.25 for Old Iron Rails. The latter came within \$2.75 @ \$3 of paying for the former. We hear of one deal of the character in question involving 10,000 and another of 3000 tons. Almost any railroad company having Old Iron Rails can afford to buy new ones in the present condition of affairs, as the old are worth almost as much as the new.

Billets, &c.—There is a continued fair demand for Bessemer Steel Billets, and the market is reported steady at \$29 @ \$29.50, cash, at makers' mill. Nail Slabs, \$28.50 @ \$29; Domestic Bloom Ends, \$19; Domestic Rail Ends, \$19.25 @ \$19.50.

Railway Track Supplies.—There is a fair business, but prices remain unchanged. Spikes, 2¢ @ 2.10¢, 30 days, delivered; Splice Bars, 1.80¢ @ 1.85¢; Track Bolts, 2.85¢ with square and 2.95¢ with hexagon Nuts. The Spike works of Dilworth, Porter & Co. are still being operated by non-union workers, and the firm express a determination to hold on firmly to the position they have taken on this point, even if they do have some trouble; they have gone into it with determination to win.

Merchant Steel.—There is a continued fair degree of activity, but no recent change in prices. Best Brands of Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-Hearth do., 2½¢.

Old Material.—There is a very fair business in the aggregate, although the demand is chiefly for small lots to supply immediate wants. No change in prices. Sales, No. 1 Wrought Scrap, \$21, net ton; Car Axles, \$26 @ \$27; Wrought Trimmings, \$14 @ \$15; Cast Scrap, \$16, gross; Cast Borings, \$12.50 @ \$13; Old Car-Wheels, \$20; Leaf Steel, \$19, net ton.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, November 5, 1888.

Pig Iron.—Dullness has been the only feature of prominence in the local market for Pig Iron during the past week. There have been one or two large buyers in the market, however, and some contracts of moment, embracing a long delivery, are reported to have been closed. These transactions, however, were probably based upon special conditions and were the exception rather than the rule. There have been a number of inquiries, however, and "offers" based upon the political situation, but the result has been "nil." While there is generally a feeling of confidence and prices are well sustained, there is evidently a misgiving in certain quarters, and some concessions in prices have been made which point to a weaker tone. The easier feeling is said to be confined to sales for immediate delivery, while for future contracts full prices have prevailed. Prices are without quotable change. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$18.50 @ \$17.00
Southern Coke, No. 2.....	15.75 @ 16.00
Southern Coke, No. 3.....	15.50 @ 15.75
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	17.50 @ 18.50
Hanging Rock Charcoal, No. 1.....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.50 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @ 18.00

Forge.

Strong Neutral Coke.....	14.75 @ 15.00
Mottled Neutral Coke.....	13.75 @ 14.00
Gray Forge.....	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 25.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @ 21.50

Nails.—There has been a fair jobbing trade and the market has ruled steady for all kinds. Jobbing prices are based upon 12d @ 40d, which sell at \$2.10 ½ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 ½ keg.

Manufactured Iron.—The market has been quiet throughout the week and some cutting of prices has been complained of, but no changes have been made which are considered legitimate. Common Bar Iron, 1.80¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ ½ lb.

Old Material.—There has been some inquiry for both Old Rails and Wheels, but few changes have been made in prices and transactions have been small. Old Rails are quotable at \$23, and Old Wheels at \$19 @ \$19.50 ½ ton, cash, here.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, November 5, 1888.

Pig Iron.—Nothing has occurred to change the general aspect of the market, which is moving along in a quiet and conservative manner. The general opinion seems to prevail that there will be but little change in the condition of the market whichever political party is successful in the election of their candidate, and it is, therefore, making but little difference in the calculations of our Pig Iron producers regarding the future. Demand and consumption keep about equal to the output, and but little speculation in Iron appears upon the surface. The Southern foundries are busier than usual, and consequently are requiring more than their usual quantity of Iron. The cause of this increased business is the very large crop of cane through South Carolina, Southern Georgia, Southern Alabama and Florida. It is estimated that the crop will exceed this year three times the amount of any previous year, consequently the demand for mills and pans is very great. There is also with the foundries a large increase in business in other lines, so at the present time they are having a heavy run of business. As prices have undergone no change, quotations are continued same as last.

Cleveland.

CLEVELAND, November 5, 1888.

Iron Ore.—The demand for Ore continues excellent, even the excitement incidental to a closing Presidential campaign failing to influence the market. About the only Ores still obtainable are a few lots of non-Bessemer. It has already been practically settled that but a very few tons of unsold Ore will be left on the docks at the close of navigation. Furnacemen do not look upon the present quotations as exorbitant, and negotiations are already pending for all-rail delivered Ore for winter use. All of the high grade Ore that can possibly be brought down by the lake carriers have been sold, with the possible exception of a few scattering loads that will be eagerly taken when offered for sale. Menominee Range non-Bessemer have advanced to \$4.50, at which price the closing sales for the season are being made. The transportation rate from Ashland has dropped to \$1.65, and this price will be paid for the few remaining loads to be shipped from that port. The total shipments to date slightly exceed 4,175,000 tons, a figure fully 500,000 in excess of the estimated business for the season at the opening of navigation. Including the 650,000 or 700,000 tons of unsold Ore on the docks at the beginning of the season, the total amount taken by the furnacemen this sea-

son will closely approximate 5,000,000 tons. The market for all non-Bessemer is very firm, and the persistent demand for the few thousand tons still to be used seems likely to result in advances within the next ten days.

Pig Iron.—Prices have neither advanced nor declined since last week's quotations were given. The market is, however, firm, and immediately after the election the volume of business will probably be satisfactory all around again. Both sellers and buyers are watching for the result of to-morrow's election with no small measure of apprehension. Upon the verdict given will, it is claimed, depend in a large degree the condition of the market for the next year. No large sales are reported for the past week, and none are expected before next week.

Scrap Iron.—Old American Rails have been sold quite freely during the past week at \$23.75 @ \$24.25. There is very little inquiry for Old Wheels, but No. 1 Wrought is in good demand.

Manufactured Iron.—Sheets are again quite plentiful, and Bar Iron is in active demand at prices considerably in advance of former quotations.

Louisville.

LOUISVILLE, KY., November 5, 1888.

Pig Iron.—The market has been quiet, with few large sales. These, however, have been at slight reductions in prices. Political excitement has caused some unsteadiness in Iron, and furnacemen are uncertain whether to sell at once for future delivery, or wait further developments. Foundries report orders ahead, and none are complaining of scarcity of work. The prices, however, at which contracts are taken show very little profit, and it is earnestly hoped that the market will soon show an advance. Old Rails and Wheels are quiet; Rails are worth \$23; Old Wheels, \$20.50. We quote as follows:

Southern Coke, No. 1 Foundry.....	\$16.75 @ \$17.75
" No. 2 ".....	15.75 @ 16.25
" No. 3 ".....	15.25 @ 15.75
Hanging Rock Coke, No. 1 Foundry.....	17.00 @ 17.50
Hanging Rock Charcoal, No. 1 Foundry.....	20.75 @ 23.00
Southern Charcoal, No. 1 Foundry.....	17.75 @ 18.25
Silver Gray, different grades.....	14.25 @ 15.00
Southern Coke, No. 1 Mill, Neutral.....	14.80 @ 15.00
" No. 2 ".....	13.50 @ 14.50
" No. 1 " Cold Short.....	14.00 @ 14.50
Charcoal, No. 1 Mill.....	15.50 @ 16.25
White and Mottled, different grades.....	13.25 @ 13.50
Southern Car-Wheel, standard brands.....	22.75 @ 23.75
Southern Car-Wheel, other brands.....	19.00 @ 21.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Hanging Rock, Warm Blast.....	19.00 @ 20.00

New York.

Office of *The Iron Age*, 66 and 68 Duane street, NEW YORK, November 7, 1888.

American Pig.—The week under review has been very quiet, very little business being done. We print elsewhere our monthly statistics, which show that the capacity of the Anthracite furnaces has remained practically unchanged, but that the South and West has notably increased. We continue to quote Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is very quiet, with prices remaining: Coltness, \$21.50, nominally; Shotts, \$20.75 @ \$21; Langloan, \$21, and Dalmellington, \$20.25 @ \$20.50.

Bessemer Pig.—There have been large purchases of Bessemer Pig in Eastern Pennsylvania, one Eastern Rail mill alone buying about 15,000 tons of Cornwall Pig from Lebanon Valley furnaces at \$15 at furnace for the three numbers.

Spiegeleisen.—No business of any consequence is reported. Importers ask \$27

for German 20 % Spiegel, \$33 for 30 % and \$54 @ \$54.50 for 80 % Ferromanganese.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Bar Iron.—We quote: Carload lots, half extras, 1.67½¢ @ 1.7¢ for Common; 1.7¢ @ 1.8¢ for Medium, and 1.8¢ @ 1.9¢ for Refined, with prices for fancy brands running up to 2.4¢ @ 2.5¢.

Steel Rails.—The 21,500 tons alluded to in the last issue of *The Iron Age* as having been purchased for the Vanderbilt system were not the total of the orders placed. We understand that the quantities purchased were 17,000 for the New York Central and West Shore, 8500 tons for the Lake Shore and Pittsburgh and Lake Erie, 6500 tons for the Michigan Central, 5000 tons for the C. C. C. and I. and 3000 tons for the Nickel Plate, a total of 40,000 tons. Three-quarters thereof, the Western business, went to Pittsburgh and Chicago mills, the former taking the bulk of it. We hear of additional transactions east of the Allegheny Mountains and South, aggregating between 30,000 and 40,000 tons, by two mills, one Western and one Eastern, at private terms. It is generally believed in the trade that the price named for a part of the Vanderbilt order by the new Pittsburgh mill was considerably lower than any given thus far. Whether or not the sale establishes the price at the low level reached must depend upon the eagerness of the newcomer for business and upon his ability to turn out product during the first six months of 1889. If a vigorous contest is made for business some demoralization is considered inevitable. On the other hand, work is coming up from unexpected quarters. Thus the receiver of a large South-western road is in the market for 50,000 tons of Rails, some of them for immediate delivery. Some of the large orders for other sections alluded to in former issues have not been placed, so far as is known. The market is somewhat irregular and our quotation of \$27.50 @ \$28 is continued, though particularly desirable orders could be placed at close to \$27, with the Western market relatively lower.

Financial.

The struggle over and the tumult of contending factions having subsided, the great disappointed minority will gracefully acquiesce in the decision of the popular voice. All alike will now contemplate the future with cheerful hopes, confident in the belief that a renewed career of prosperity awaits the country, in all its vast and varied interests. Recovery must quickly follow the period of partial paralysis, although the testimony from business sources is quite general that the interruption of the last few days has been much less serious than is usual during like periods of political agitation. Dun & Co.'s last circular says: "The single fact that bank exchanges outside of New York, in the last week of a Presidential campaign, exceeded those of last year by 10½%, the clearings of last year having been exceptionally large, proves that the volume of legitimate business is unprecedented, for only a part of the increase can be attributed to speculative operations." A review of the statistics of bank clearings for October and the last ten months, as given by *Bradstreet's*, possesses much interest. The aggregate clearings at 32 cities

during October—those for which totals are available for four years—show a gain of about 10 % over October, 1887; about 6 % over October, 1886, and nearly 11 % over the corresponding month in 1885. The bank clearings outside of New York City have increased relatively more rapidly than at the metropolis. Leaving New York's totals out of those first given above, it is seen that the aggregate clearings for October, 1888, at 31 cities were \$1,776,035,290, or 15 % more than in October, 1887, 17 % in excess of the aggregate for that month in 1886, and 35 % larger than in 1885. It will be recalled that early in the year the clearings declined notably as compared with the preceding 12 months, and to this must be attributed the decreases in the 10 months' totals as compared with 1887. The aggregate at 32 cities is 5 % less than in 1887; at New York it is 8 % less.

The Stock Exchange markets have been uninteresting in the absence of any pronounced movement to affect prices, bulls and bears alike seeming to acquiesce in a policy of inaction until the political atmosphere cleared a little. Respecting the future opinions diverge, depending much on the settlement of the surplus question as affected by the election and upon crop movements. Attention was almost entirely absorbed by Reading and New York and New England—these two and Union Pacific furnishing about one-half of the entire week's business. All three closed lower than at the end of the previous week. The situation among the Southern roads continues to attract attention, and there is a very general impression that the Richmond Terminal antics are but the beginning of a grand consolidation of Southern roads east of the Mississippi. The trunk lines were strong throughout. The decline in Reading was attributed to the possibility of lower prices for coal. It was authoritatively stated that there is no truth in the story from Baltimore to the effect that the Richmond Terminal company is negotiating for the acquisition or control of the Baltimore and Ohio. Union Pacific defaulted on the interest on Denver, South Park and Pacific bonds and the bond market generally was a little lower.

Government bonds were steady. Quotations as follows:

U. S. 4½s, 1891, registered.....	107¾
U. S. 4½s, 1891, coupon.....	108¾
U. S. 4s, 1897, registered.....	127
U. S. 4s, 1897, coupon.....	127
U. S. currency 6s.....	122

The weekly bank statement shows a decrease of \$1,968,150 in surplus reserve, which now stands \$18,730,595, against \$9,786,550 at the corresponding time last year and \$5,632,750 in the first week of November, 1886. The decrease in reserve is larger than had been generally anticipated. In the currency movement receipts and shipments were about equally balanced, but there were free shipments South. In loans there was an expansion of \$704,500. Specie showed an unexpected decrease of \$2,397,600, and legal tenders increased \$242,900. Deposits decreased \$746,200. The November interest and dividend disbursements are estimated at about \$25,000,000. The railroads alone pay out nearly \$22,000,000, of which \$15,000,000 will be for interest on bonds. Money on call, owing to the demand caused by the monthly settlements, advanced in some cases to 4½%. Time loans were offered in abundance at 3 to 3½% for three months or less, and at 4 % for four to six months where first-class collateral was offered. Commercial paper was in fair supply and the demand continued good. Quotations, 60 to 90 days, 4½% @ 5%; first-class four months' commission house names 5 % @ 5½%.

The posted rates for bankers' sterling are \$4.85 @ \$4.85½ for 60-day and \$4.88½ for sight. The market is strong. In Lon-

don money was easier. No further gold withdrawals from the Bank of England are announced as imminent. In consequence of uncertainty the directors have no choice but to maintain the present anomalous position.

Bond purchases by the Treasury Department during the week aggregated \$2,412,000. All were 4½s at 108½, and nearly all the offerings were at that figure. About \$3,000,000 4 % were offered during the week at prices ranging from 128 to 130, mainly at 128½, but none of them were accepted. Bond purchases up to date under the April circular aggregate \$92,159,850; and of this amount, in round numbers, \$51,750,000 were 4s and \$40,750,000 were 4½s.

The public debt statement shows that the reduction during the month of October was \$4,585,619.91. The total debt is now \$1,708,457,224.23, of which \$1,696,124,917.23 is principal and \$7,332,307 is interest. The decrease of debt since June 30, 1888, is \$28,294,620.57. The cash in the Treasury available for reduction of the debt is \$391,675,218. National bank depositories to-day hold \$54,480,279, or about \$3,000,000 less than on October 1. Government receipts during October were \$31,966,208, against \$31,803,172 in October, 1887. Receipts from all sources for the first four months of the fiscal year reach \$129,500,000, against \$134,131,569 for the first four months of the preceding fiscal year. The Treasury surplus is now about \$70,000,000, or \$40,000,000 below the highest point attained during the past year, and the money in circulation throughout the country is greater than at any previous time, partly as a consequence of the free silver coinage.

The wheat market has been much less excited, and spot stock is neglected. A curious feature was that on one or two entire days not a bushel was sold of spot stock. This has not happened before in many years. The demand for actual wheat is spoken of as no longer a factor, so that the absence of an export market has no appreciable influence. For the week there was a decline of 3½ @ 4¢ a bushel on near futures. Breadstuffs, on account of this peculiar situation, are slow and hesitating. Cash corn toward the end of the week declined to the lowest point reached in some months. The total decline for the week was ¼¢ @ 1¼¢ a bushel on the near futures. Export business became very good when the lowest quotations were reached. The latter market is firmly held. The provision market is slow. The pork-packing season ended November 1, and returns from all points in the West indicate a total of about 5,070,000 hogs, against 5,610,000 last year. Sugar is without interest. Spot cotton is steady at full previous quotations. The report that the Farmers' Alliance of Georgia and Alabama had ordered its members not to sell between November 1 and 20 did not appear to have any effect on prices. Teas are steady and moderately active. Wool has a strong look. Ocean freights are decidedly firm, with increased inquiry for room to load corn. Coffee was depressed by large stocks at shipping ports and heavy receipts. In dry goods the order trade for spring maintains all the encouraging features previously noted. Values are steadily maintained. The railroads are carrying the largest tonnage in their history. The New York City Comptroller awarded \$1,500,000 of additional water stock to the Farmers' Loan and Trust Company, Mayor Hewitt remarking that the bids showed that the city of New York enjoys the highest credit of any corporate body in the world.

The imports of merchandise at this port during the week were valued at \$8,668,000, of which \$1,733,000 represents dry goods. Since January 1 the total is \$395,409,000.

against \$398,662,000 for the same time last year and \$369,534,000 in 1886.

According to official figures of the United States Department of Agriculture, the winter wheat crop this year is about 275,000,000 bushels, and spring wheat 183,000,000 bushels, making a total of 458,000,000 measured bushels.

Boston dispatches announce that W. D. Forbes, president of the Bank of Redemption, in that city, had resigned from his position and had made an assignment, the cause being unfortunate speculation in Atchison. The bank, it was said, loses nothing.

Metal Market.

Copper.—During the week under review London has improved with spot Chili Bars from £78 to £78. 5/, and with futures from £78. 10/ to £79. Good merchantable brands have followed suit and come £78. 5/, as against £78 a week ago. Best Selected has advanced to £83, sales 600 tons. The visible supply in England and France, as reported per cable, was, on the 1st inst., 91,740 tons, against 89,404 on October 1 and 48,500 tons on November 1, 1887. It is reported from Europe that Chili Bars are being transferred gradually from England to France, because in the latter country more liberal advances are made on them in store than in England. Absolutely nothing transpired in the open market in Copper during the week; the quotation is nominally 17½¢ for Lake Ingot and 16¢ @ 16½¢ for casting brands.

Tin.—The November 1 statistics are 11,913 tons visible supply in Europe and America, against 11,451 on October 1, and 12,966 tons on November 1, 1887, being tolerably good, London has advanced with spot Straits from £102 to 102. 2/6, and futures, £102. 10/ to £102. 12/6, sales, 550 tons. Here a listless state of affairs prevailed, 10 tons spot selling on the Exchange at 22.65¢, but it is held at the close at 23¢, 22.75¢ being bid for November and 22.65¢ for December. The October Tin shipments to the United States from the Straits Settlements sum up 750 tons, against 100 last year, and to England, 2000, against 2500; since January 1 they have been respectively 2900, against 4100, and 15,700, against 12,700, as per cable from Gilfillan, Wood & Co., Singapore, to Chas. Nordhaus, 89 Water street, New York, their agent.

Tin Plates.—Our market has been very quiet and nominally unchanged, with the exception of Coke Tins, which are 5¢ per ton lower. There are a good many inquiries being put out for forward delivery, and, as makers' views are somewhat lower, no doubt business will result, now that the tariff question may be deemed settled. We quote at the close, large lines, ordinary brands, per box: Siemens-Martin Steel, Charcoal Finish, \$5 @ \$5.75; Coke Finish, \$4.70; Terns, \$4.20 @ \$4.35; Bessemer Cokes, \$4.40 @ \$4.45; and Wasters, \$4.25. Cokes are 13/3 @ 13/6 at Liverpool.

Lead.—The market has been comparatively quiet and featureless. Consumers have been picking up a little Lead in the open market to the extent of 500 tons at 3.70¢ @ 3.75¢, and on the Exchange 750 tons have changed hands at similar rates, the closing rate in the open market being 3.67½¢ @ 3.75¢, at which there is a steady feeling, sales of spot Lead having been made at 3.67½¢. The London market is £13. 12/6 Soft Spanish, and £13. 17/6 English Pig. At St. Louis there has been firmness at 3.60¢ @ 3.62½¢ Common, and 3.65¢, Corroding.

Spelter.—Remains in good position at 5½¢, Common Domestic, the lowest at which it can be had. Silesian is quoted £18. 17/6 in London, and here 6¢.

Antimony.—A fair demand has prevailed at 10½¢ @ 10½¢, Hallett, advanced to £63 in London, and 12½¢ @ 13¢, Cookson.

New York Metal Exchange.

The following sales are reported:

THURSDAY, November 1.	
200 tons Lead, cash.....	3.72½¢
228 tons Lead, November.....	3.82½¢
16 tons Lead, November.....	3.80¢
SATURDAY, November 3.	
16 tons Lead, December.....	3.67½¢
MONDAY, November 5.	
10 tons Tin, spot.....	22.65¢
WEDNESDAY, November 7.	
170 tons Lead, spot.....	3.67½¢
50 tons Lead (in transit).....	3.67½¢

Coal Market.

The Anthracite Coal market is very dull, with all descriptions in excess, Stove excepted, and no improvement is looked for while the present mild temperature continues. The first sign of weakness was in the Steam sizes, such as Broken, Steamboat and Pea, and with the closing of furnaces in Pennsylvania, on the line of the Reading particularly, the depression from this source became more noticeable. The sales agents in this city at their last meeting made no change. Bituminous Coal is in good demand and the scarcity of cars is still a subject of complaint. Prices are more or less affected by competition in supplying the market, so that while pool prices are recognized as a basis, and are sometimes insisted upon, sales of inferior grades are made as low as \$2.90. The interior demand can hardly be maintained beyond another fortnight in prospect of interrupted navigation. The statistics of Anthracite production for the last week are not at hand, but it is surmised that the aggregate is not more than 750,000, owing to shortened time in the Lackawanna region, as compared with 886,000 during the previous week.

Freights from New York eastward are quoted at 50¢ to New Haven, \$1.10 to Boston and \$1.15 to Portland, free of discharging. The average price of Coal in October at the Schuylkill collieries, drawn to determine wages, was \$2.61; last year it was \$2.62. The trade is grieved to hear of the serious illness of Fred. A. Potts. On Wednesday morning he was more comfortable. Pittsburgh is to have another outlet to Lake Erie by way of the Pittsburgh and Western Railroad to Butler, and from that point by an intermediate link connecting with the Nickel Plate road. The new line will be an important competitor of other Pittsburgh lines to the lakes in the Coal, Coke and Iron industries. The road will connect with the Lake Shore at Amasa.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from October 19 to November 1, inclusive, and from January 1 to November 1, inclusive, were as follows:

Iron and Steel.		Oct. 19 to Nov. 1. Tons.	Jan. 1 to Nov. 1. Tons.
Iron Ore: A. Earnshaw.....		348	6,687
Pig Iron: Crocker Bros.....		800	10,997
Naylor & Co.....		750	7,245
G. W. Stetson & Co.....		500	13,580
G. T. Carter.....		130	130
Muller, Schall & Co.....		100	100
N. S. Bartlett.....		100	4,800
James Williamson & Co.....		100	5,000
Spiegelheisen: Naylor & Co.....		1,499	11,132
J. A. Jansen.....		840	11,392
Crocker Bros.....		825	10,660
Dana & Co.....		465	3,963
Geisenheimer & Co.....		10	230
Steel: Geirichs & Co.....		192	390
W. F. Wagner.....		55	1,265
R. H. Wolf & Co.....		49	563

Kunhardt & Co.....	33	33
J. Abbott & Co.....	300	499
M. Cohn.....	12	220
Thos. Prosser & Son.....	30	88
M. Strouse & Co.....	22	52
Montgomery & Co.....	19	87
C. F. Boker.....	18	211½
Chas. Hugill.....	15	264½
Pierson & Co.....	14	134
Newton & Shipman.....	13	142
R. F. Downing & Co.....	12	212½
F. S. Pilditch.....	11	475
A. Milne & Co.....	69	1,175
C. W. Power.....	4	56
Temple & Lockwood.....	2	11
Steel Rods: Naylor & Co.....	198	17,116
Dana & Co.....	528	5,061
R. H. Wolf & Co.....	207	3,531
A. Heyn.....	101	1,512
G. A. Galpin.....	50	2,870
J. Abbott & Co.....	50	3,890
Hondollette & D.....	30	30
Cary & Moen.....	22	781
Pierson & Co.....	20	41
J. A. Roebling's Sons.....	15	1,496
Steel Blooms: Naylor & Co.....	1,632	3,798
Steel Bloom Ends: Dana & Co.....	191	1,319
G. T. Carter.....	190	661
Steel Sheets: Pierson & Co.....	32	972
Lalance & G. Mfg. Company.....	27	494
Williams & Whitney.....	10	39
Steel Billets: Naylor & Co.....	202	1,947
A. Milne & Co.....	76	915
Steel Billet Ends: Dana & Co.....	124	124
Steel Wire Rods: Dana & Co.....	233	233
Naylor & Co.....	614	614
Cary & Moen.....	50	63
Steel Strips: M. Strauss.....	20	20
Steel Wire: J. A. Roebling's Sons.....	57	248
Steel Hoops: A. R. Whitney & Co.....	136	2,380
Naylor & Co.....	25	25
Steel Boiler Plates: Post, Martin & Co.....	15	15
Steel Barrel Hoops: A. R. Whitney & Co.....	224	224
Iron: J. Abbott & Co.....	52	6,573½
Iron Rods: Naylor & Co.....	101	648
J. Abbott & Co.....	50	242
Iron Girders: R. F. Downing & Co.....	1½	502½
Iron Wire Rods: J. Abbott & Co.....	201	201
R. H. Wolf & Co.....	50	110
Charcoal Iron: Page, Newell & Co.....	20	848
Scrap Iron: A. Abbott.....	206	206
Swedish Bar Iron: C. v. Philip.....	120	896
Swedish Rough Bars: C. v. Philip.....	120	865
Cotton Ties: Bullard & W.....	75	1,720

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	35,638	504,801
Dickerson, Van Dusen & Co.....	18,385	248,291
A. A. Thomsen & Co.....	11,962	128,410
Pratt Mfg. Co.....	9,082	151,806
T. B. Coddington & Co.....	6,050	146,585
Bruce & Cook.....	5,638	88,230
N. L. Cort & Co.....	4,840	96,878
Wolf & Roessing.....	3,448	84,958
Central Stamping Company.....	3,371	32,127
R. Crooks & Co.....	3,290	61,674
G. B. Morewood & Co.....	2,607	48,288
Hy. Whittemore & Co.....	1,614	45,293
Lombard, Ayres & Co.....	1,372	18,115
E. S. Wheeler & Co.....	1,062	7,871
Merchant & Co.....	912	20,210
H. R. Demilt & Co.....	653	17,202
Jas. Byrne & Son.....	500	33,354
Lalance & G. Mfg. Co.....	328	4,748
S. Shepard & Co.....	225	18,758
C. S. Mersick & Co.....	144	6,260

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	449,232	9,960,901
Phelps, Dodge & Co.....	392,772	2,180,557
Naylor & Co.....	348,634	2,822,022
Jas. E. Pope, Jr.....	67,238	394,104
American Metal Co.....	55,921	2,708,378
D. Thomsen & Co.....	22,906	249,363
Knauth, Nachod & Kuhne.....	22,324	96,638
A. A. Thomsen & Co.....	22,282	186,729
R. Crooks & Co.....	22,000	796,616
Lehmaier, Sons & Co.....	14,024	102,054
Lead: American Metal Co.....	22,148	44,296
Spelter: American Metal Co.....	55,805	609,054
Sheet Zinc: H. Lamarche's Sons.....	3,881	8,212
Antimony: Phelps, Dodge & Co.....	50	600

Iron and Metals Warehoused from October 19 to November 1, Inclusive:

	Tons.
Scrap Iron: E. P. Spaulding & Co.....	496
Lead: Schultz & Ruckgaber.....	863,987

Hardware, Machinery, &c.

Backus, Q. S., Iron Castings, 17	
Barbour Bros. & Co., Mach'y, pkgs., 7	
Bernard, Geo. B., Ironwork, pkgs., 50	
Boker, Hermann & Co., Mdse., cs., 4; Iron Chains, cks., 28	
Boker, Carl F., Mdse., cs., 21	
Clark Thread Company, Mach'y, pkgs., 85	
Field, Alfred & Co., Mdse., cs., 46	
Graef Cutlery Company, Cutlery, cs., 5	
Meacham Arms Company, Mdse., cs., 80	
Pierch. Deep Company, Mach'y, pkgs., 23	
Pierson, H. L., Ironwork, pkgs., 273	
Schoverling, Daly & Gales, Mdse., cs., 4	
Wiebusch & Hilger, Lim., Mdse., cs., 6; Iron Chains, 22	
Order, Mach'y, pkgs., 4	

Exports of Metals.

	Oct. 19. to Nov. 1. Pounds.	Jan. 1 to Nov. 1 Pounds.
Copper: J. Abbott & Co.....		11,384,030
Lewisohn Bros.....	88,750	3,997,772
F. A. Lomal.....		2,581,293
American Metal Company.....	172,000	5,986,862
G. H. Nichols.....		223,939
J. Bruce Ismay.....		112,000
S. Mendel.....		560,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Com- pany.....		224,034
J. Kennedy, Tod & Co.....		112,028
H. Becker & Co.....		1,250
Orford C. & S. Rtg. Company.....		449,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....		1,461,130
Williams & Terhune.....	99,320	99,320
J. Parsons & Co.....		420,000
Naylor & Co.....		448,809
Bridgeport Copper Com- pany.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Ladenburg, Thalmann & Co.....		229,371
W. H. Crossman & Bro.....		4,000
R. Crooks & Co.....		1,000
Copper Matte: Williams & Terhune.....	975,726	36,323,744
Lewisohn Bros.....		3,021,610
American Metal Company.....	824,968	4,080,804
J. Abbott & Co.....	42,447	337,447
C. Ledoux & Co.....		899,803
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		190,986
Kunhardt & Co.....		41,652
Spelter: Freidensville Zinc Company.....	56,000	56,000
Old Copper: Burgess & Co.....	28,704	629,337

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Nov. 7, 1888.

There has been a large business *sub rosa* in Copper and Copper furnace material, and the actual transfers the past week or ten days are in marked contrast with the transactions as reflected by the ordinary speculative trading. The purchases have been largely by the "syndicate" agents, and suggest that, while meeting the demand for Chili Bar futures freely at £78. 10/, they are ready buyers of either prompts or futures at 10/ less. One firm is reported to have sold the "syndicate" a block of 200 tons at £78, deliveries running the next two months. Among sales of Anaconda Matte the past fortnight Messrs. James Lewis & Sons' circular notes 150 tons at 15/6, at Liverpool.

Several new copper companies have been floated the past 30 days, and their shares nearly all subscribed for.

In the face of the steadily downward course of prices the greater portion of the week, prominent operators in Block Tin are prophesying a higher market for the future. Their belief is based upon the merits of the statistical position. However, the demand from other than American buyers is somewhat disappointing. It is stated that the principal buyer for the American market took 1300 tons from the London stock last month.

Pig Iron "warrant" speculation has been dormant. Inside brokers who were conspicuous in the efforts made recently to advance prices have since figured more prominently in operations of the reverse character. There is, however, a tendency to proceed with caution in view of the several influences that might be brought to bear with unfavorable effect in the event of either excessive buying or overselling. Makers' brands of Scotch Pig have ruled irregular, some showing a slight advance and others a decline. Hematites are lower, but Cleveland Pig remains steady.

There has been no change of importance in the Tin-Plate market. Makers still offer very moderately for prompt delivery in view of the extent to which they have orders booked ahead; but new orders are running very light, and those from America are disappointing. What little business has been done indicates a slight margin of difference between the actual trading basis and the prices generally quoted. The works of the Villiers Tin-Plate Company, Limited (two mills), have been started up.

In the Steel trade there has been no material change. A good business is doing in shipbuilding and railway descriptions and in Billets but at somewhat variable prices, while Blooms, Slabs and Rods are in only moderate request. Manufactured Iron continues to meet with brisk sales and prices are strong, with a further 2/6 advance on Common Bars. Old Material is in only moderate request, but the offers made find holders firmer on prices and less anxious to sell.

Scotch Pig.—The market has been very quiet and prices show some irregularity:

No. 1 Coltness, f.o.b. Glasgow.....	49/
No. 1 Summerlee, " ".....	50/
No. 1 Gartsherrie, " ".....	47/
No. 1 Langloan, " ".....	48/6
No. 1 Carnbroe, " ".....	43/6
No. 1 Shotts, " at Leith.....	48/6
No. 1 Glengarnock, " Ardrossan.....	47/6
No. 1 Dalmeilington, " ".....	42/6
No. 1 Eglinton, " ".....	41/6

Steamer freights, Glasgow to New York, 6/6

Liverpool to New York, 10/.

Cleveland Pig.—Business moderate, but no change in prices. No. 1 Middleboro', G.M.B., 37/; No. 3 do., 34/6.

Bessemer Pig.—Transactions have been on a smaller scale and prices are weaker. West Coast brands, mixed numbers, 42/6, f.o.b. shipping point.

Spiegeleisen.—The demand for Spiegel keeps up well and prices are firm. English 20% quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—The market continues active, and prices, while irregular, are firm. Standard English sections quoted at £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Blooms.—No improvement in the demand for these, and prices unchanged. We quote £3. 18/9 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—There is still a fairly active business and prices are held firmly. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—A moderate business passing at about former prices. Bessemer, £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Makers very firm on prices and report a good demand. Mild Steel No. 6 quoted at £6 and No. 5 at £5. 19/3, f.o.b. at N. W. England shipping point.

Scrap Iron.—The market slow and prices irregular. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Old Rails.—Business moderate, but sellers firmer on prices. Tees quoted at £3. 2/6, and Double Heads £3. 5/ @ £3. 6/3, c.i.f. New York.

Crop Ends.—A fair business at steady prices. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—Slightly lower prices on prompt deliveries and no improvement in

volume of sales. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/	@ 15/6
IC Bessemer steel, Coke finish.....	14/	@ 14/3
IC Siemens.....	14/	@ 14/3
IC Coke, B. V. grade.....	13/6	@ 13/6
Charcoal Terne, Dean grade.....	12/	@ 12/6

Manufactured Iron.—Demand continues brisk and the market strong. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars.....	£ s. d.	£ s. d.
" Common.....	@ 8	2 6
Staff. Bl'k Sheet, singles.....	@ 5	10 0
Welsh Bars (f.o.b. Wales).....	4 17 6	@ 5 10 0

Tin.—A fair business at irregular prices. Straits quoted at £102 @ £102. 5/, spot, and £102. 10/ @ £102. 15/ for three months' futures.

Copper.—The market firm, but rather quiet. Chili Bars, £78. 7/6, spot, and £79, three months' futures. Best Selected, £82 @ £83.

Lead.—Dealings have been large and the market shows more firmness. Soft Spanish, £13. 15/.

Spelter.—A fairly active business at steady prices. Silesian, ordinary, £18. 15/.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Wire (Portugal).....	\$1.06
Wire (Brazil).....	\$1.6
Mark (Germany).....	23.5
Picul.....	2.205
Kilogram.....	184.

BRAZIL.

PARA, October 30, 1888.—*India Rubber*.—Shipments from Para to the United States for the months of August, September and October are 600 tons less than for the same time last year, the falling off being due to an increased demand for Europe. The stock remaining on hand is a mere trifle, and so is the amount afloat for New York.—*Per cable direct*.

EAST INDIES.

SINGAPORE, September 19, 1888.—*Tin*.—Our last report was dated 5th inst., since when a large business has been done at up to \$39.25 picul, and the market closes firm at \$38, with buyers, but no sellers. Shipments for the remainder of the year are expected to average at least 2000 tons per month. During the first eight months there have been shipped from the Straits Settlements to the United States 22,289 piculs, as compared with 59,481 last year, 52,817 in 1886, 20,253 in 1885, 41,857 in 1884, and 78,739 in 1883. *Gum Copal*.—There are some signs of a revival in the demand, and we have to report sales of upward of 4600 piculs, mostly for the United States. Prices have ranged from \$4 to \$11, according to quality. *Gum Damar*.—Some sales of Palembang have been made at \$20.25 @ \$21.50. *Tonnage*.—London rates via canal have advanced owing to scarcity of tonnage, to 35/ for weight. New York via Cape, the Sontag and W. Gildemeister are loading; cargo is very scarce, and rates are a shade easier. For Boston the John M. Clerk is loading. *Exchange* is firm at 3/2½ for six months' sight credits.—*Gilfillan, Wood & Co.*

MANILA, October 29, 1888.—*Hemp*.—Has been steady at \$11.12½ @ picul, against \$9.50 same date last year, equaling per ton cost and freight, £38. 7/6, against £33. 17/6. Clearances for the United States since last cable amount to 12,000 bales, against none last year; since January 1 they reach 184,000, against 190,000 bales; there remain loading for ditto 42,000, against 56,000; clearances for England since January 1, 284,000 bales, against 184,000; loading for ditto, 1000, against 5000; cleared for other countries, 61,000, against 34,000; receipts at all ports since last cable, 17,000, against 12,000; since January 1, 532,000 bales, against 443,000 in 1887, and 337,000 in 1886. *Freight*, \$1, against \$5.50. *Exchange*, six months' sight on London, 3/7, against 3/8½.—*Ker & Co. to Mr. Charles Nordhaus, their agent, 89 Water street, New York, per cable direct.*

SPAIN.

BILBAO, October 20, 1888.—*Iron Ore*.—A good deal of business has been done during the week, not only on the spot for single cargoes, but considerable amounts have been bought

for forward delivery next year extending over nine months in succession, at 8/ @ 8/4 for Cam-pinil, and 7/ @ 7/6 for Rubios. These are the figures current to-day, but they may have been slightly different at private sale. The number of steamers in port is still quite reduced, hence the amount of Ore shipped is not as heavy as last year, not exceeding since January 1 3,019,759 tons, as compared with 3,546,227 during the corresponding period in 1887. *Pig Iron*.—Shipments to Hamburg have been made to the extent of 1480 tons, and 235 tons coast-wise.—*Bilbao Marítimo y Comercial*.

GERMANY.

HAMBURG, October 27, 1888.—*Iron*.—The Rhenish-Westphalian Pig Iron market has, on the whole, been getting livelier. The demand for Steel material from abroad has resulted in larger orders; should this movement continue a little longer, it cannot fail to have a favorable influence on Pig Iron of all sorts. The feeling in Spiegel is improving; more is asked for it. Siegen makers have raised the price for Forge Pig to 48; there are orders for delivery next year. Thomas is in brisk request at 44. Bessemer, on the other hand, is dull at 52 @ 53. Foundry Pig is taken steadily at 53 @ 56. English Bessemer cannot be had for less than 44/8 on the West Coast. White Luxembourg Pig is worth 37.50; Gray, 43. Finished Iron is selling well for domestic use; the reverse is the case for export. At ruling high prices for Pig, Finished cannot be made cheap enough for export. Hoop Iron remains steady at 127.50. Plates and Sheets of all sorts continue doing well. The drawn Wire syndicate is to terminate on November 28; efforts will be made to continue it on a modified basis, pending which the Wire branch is unsettled. Wire Nails have of late been selling easily enough, but at depressed, unremunerative figures. Both foundries and machine shops are, if possible, still busier than before; this applies quite as much to car works. *Metals*.—Lead is drooping, Copper weaker, Spelter sustained.—*Bor-senhalle*.

The Paris Exhibition.—Preparations for the Paris Exposition of 1889 are on a colossal scale. The Eiffel Tower has reached an altitude of about 500 feet, or one-half of the total elevation. To the right and left rise two gigantic and graceful domes, and beyond, interspersed with kiosks and fountains, are seen the lofty roof and domed portico of the great central exposition hall. Between the central building, with its two enormous wings, are fast rising a number of minor structures, destined to receive the products of favored industries. Then all along the Quai d'Orsay and the river front, down to the esplanade of the Invalides, are series of long galleries for the reception of agricultural produce and machinery. On each side of the Pont de Jena, and fronting the Trocadero, they are constructing groups of buildings representing the habitation of man in every country, among all races, and at every stage of civilization, furnished as near to the historical reality as possible. The Trocadero itself, with its central buildings, its vast semicircular galleries and colonnades, its cascades and grounds, is to serve for a horticultural exhibition. In the left wing are exposed casts of all the masterpieces of ancient, mediæval and modern sculpture, together with casts and photographs of all the most renowned building of the East and West. The ethnological museum and the objects secured from New Mexico, Colorado and other Western regions are especially attractive.

A tunnel, over a mile long, and cut through solid rock, at a cost of \$1,000,000, has just been completed on the Montana Central railroad.

Burton H. Cook, 140 Quiney street, Brooklyn, N. Y., exhibits, at the American Institute Fair, Cook's Rotary Ash Sifter and Coal Screen. The device is shown in Mr. Cook's exhibit, which stands at the north side of the main hall. The circulars state that the Cook's sifter took the first medal ever awarded by the American Institute, and in 1887 was given the medal of superiority.

Hardware.

During the past week business has been exceptionally quiet and there is little new to be reported, but it is expected that with the subsidence of engrossing attention to politics there will be a return of trade to its former regular and satisfactory condition. Prices in most lines are unaltered.

Cut Nails.

Very little has occurred during the week to change the tone of the market, Cut Nails remaining \$1.80 to \$1.90 from dock for carload lots, and \$1.90 to \$2 from store. The refusal of a Chicago concern to enter into any arrangement has caused the proposed Western Nail Association to be given up for the present.

Barb Wire.

The market remains unchanged, prices continuing as before, with only a moderate demand. Quotations in this city are as follows: Galvanized Four-Point, 8.55 to 3.6 cents, with concessions for large lots.

Wire Nails.

The market remains unchanged since our last report, prices being regularly maintained by the manufacturers, whose business is, however, limited on account of the frequent offerings by parties who purchased largely at the lately ruling low prices, from whom the goods may be purchased at from 5 to 10 cents per keg below the extreme price at which the associated manufacturers are at liberty to sell. The regular quotations remain as before: \$2.65 for small lots, and \$2.55 for carloads. Wire Nails in papers are not as firm as the Standard Nails, owing especially to the fact that they are made by several outside parties, and there is no difficulty in obtaining the goods at slight concessions beyond the regular prices.

Miscellaneous Prices.

A very large business is done in Mica in Chicago, and, until quite recently, prices have been very steady, and results have been satisfactory to both the dealers and the producers whom they represent. A reasonable profit was obtained, which was fairly remunerative to all parties, and, at the same time, repressed speculation. Now, however, the trade is demoralized, values ruling below the actual cost of production, according to statements made by those in a position to ascertain the facts. One large dealer claims that some of his competitors have lowered prices fully 25 per cent. The reduction was not caused by a sudden increase in the supply, but by injudicious salesmen who were unduly influenced by buyers. It will take some time for the Chicago Mica market to recover from the effects of this ill-advised action. It is another illustration of the evils of giving salesmen discretionary power to name prices.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., have added a new and important department to their business, as they are making a specialty of Fire and Burglar-Proof Safes. These goods, which are illustrated in a separate catalogue, are offered to the trade at special prices as follows, terms 60 days, or 2 per cent. discount for cash in 10 days:

No. 2 Safe.....	\$17.50
No. 3 Safe.....	25.00
No. 4 Safe.....	35.00
No. 5 Safe.....	55.00
No. 6 Safe, with usual hinges.....	65.00
No. 6 Safe, with double crane hinge.....	70.00

Henry's Patent Combination Haft, manufactured by Joshua Britton & Son, Stoughton, Mass., and shown in their advertisement on page 55, is sold at \$6.50 per dozen.

We are advised that P. Lowentraut, Newark, N. J., for whom James Forsyth is agent, 116 Chambers street, New York, has as many orders for Skates as he will be able to fill by December 1, and in order that his customers may not be disappointed desires it to be noted that he is not in a position to fill other orders until that date. He also announces an advance of 20 cents on No. 1 and No. 8 Skates, and 25 cents on all other numbers.

The following revised prices, under date November 1, have been announced for Lead Pipe, Sheet Lead, Block Tin Pipe and Tin Lined Pipe:

Lead Pipe, per pound.....	6 1/4 cents.
Block Tin Pipe, per pound.....	45 cents.
Sheet Lead, per pound.....	7 1/2 cents.
Tin Lined Pipe.....	15 cents.

McIntosh, Huntington & Co., Cleveland, Ohio, announce special prices on Slaw Cutters and Cimeter Hay Knives.

The prices of Wrought-Iron Pipe are firmly maintained at the last advance and the quotations named by the different manufacturers are substantially the same, an understanding in regard to prices having been again reached.

The ruling prices of Tacks show a considerable divergence in the quotations of different manufacturers, and some lower prices than have heretofore prevailed are now ruling.

The following revised prices for Shot were announced by the manufacturers November 1. They are subject to the usual discount of 2 cents for cash in five days:

Drop, per 25-pound bag.....	\$1.85
Drop, per 5-pound bag.....	.32
Buck and Chilled, per 25-pound bag.....	1.60
Buck and Chilled, per 5-pound bag.....	.37

Foster Bros., Fulton, N. Y., in their catalogue represent their line of Cleavers, Butcher Knives, &c., giving illustrations of the goods, their price list being furnished in a separate sheet. Their announcement in regard to this line of goods will be observed on page 59, in which some of their patterns are represented. Their Knives are subject to a discount of 40 per cent., and their Cleavers to a discount of 30 per cent.

Ammunition.

As the result of conferences between the special houses and the Ammunition Association some important changes have been made in the system by which the association markets its goods and regulates prices. The E. C. Meacham Arms Company, St. Louis, has been reinstated as a Special House. This action was taken so that the market might be free from the serious disturbance that would result from the continued opposition of the company and their offering goods at irregular prices. It was ultimately approved by the other specials, by whom the modifications made in the system of the association were also accepted. These changes are made with a view to correcting the irregularities which had developed and also making the arrangement more satisfactory and permanent. No change has been made in the prices of the goods or in the terms at which they are obtained by contract or non-contract houses, but a modification of the arrangements with the special houses has been decided upon. In the new plan, the main features of which are settled, though some minor details are still undecided, the special houses will receive from the association a fixed sum in lieu of the commission heretofore given them on goods sold by them to the contract houses, thus removing, it will be seen, some incentive for seeking as large a proportion of the business of the A houses as they have recently been obtaining. The one-third clause, to which strenuous objection has

repeatedly been made, has been rescinded, and also the requirement that the reports of the special houses be attested by affidavit. It is hoped that the new measures thus adopted will have the effect of putting the Ammunition business in better shape than it has been for some time. Precisely what effect the new method of remunerating the special houses as distributors of the goods may have remains to be seen, but it will probably lead them to seek more than heretofore the orders of non-contract houses, on which they are given a commission or rebate, and at the same time it removes the inducement to special efforts to sell the contract houses, as for such business they are paid a fixed sum, without reference to the amount of their sales. The fact that the E. C. Meacham Arms Company have been restored to their former place as a special house, and are understood to be heartily in accord with the new system, is an important feature in the situation.

Trade Topics.

At the last meeting of the Heavy Hardware Jobbers' National Union, held in St. Louis, on the 19th ult., the following resolution was offered and unanimously approved:

Whereas, The present tendency in trade and traffic is developing into combinations and trusts, the very spirit of which savors of centralization of capital and power, which of itself is directly opposed to the genius of our national institutions. This association favors the broadest freedom and independence, in both buying and selling, and it is not the purpose of this association to combine on prices in either buying or selling; therefore, be it

Resolved, That no combination or selling prices are intended by this association, but that we associate for mutual protection with each other in trade, and while not establishing prices which will bind any locality, or individual member, each member of this association pledges himself to each other to sell his goods, of all classes, at prices which will yield a reasonable net profit, and that we each recognize the fact that legitimate trade requires this and no more to preserve individual freedom of action, while at the same time mutual cooperation as members of an association.

The unbusiness-like habit which is sometimes practiced of failing to prepay telegrams when desiring information from merchants and manufacturers in regard to goods which they offer, is referred to in the following letter:

I wish to all your attention to the fact that some business men send all their telegraphic dispatches collect. It is a nuisance. Some persons, I suppose, think that because a man favors another with his trade that he is at perfect liberty to wring out of him all the expense of wiring, whereas such expenses between the two parties that are dealing with each other ought to be mutual—that is, each party prepay his own dispatches. Of course, I do not mean that answers ought to be prepaid where such answers do not involve or anticipate any prospective business between the two, but where two merchants or a merchant and manufacturer are dealing together, each ought to prepay his own dispatches. Some three months ago a merchant commenced wiring me collect, negotiating for a carload of goods, and before I could stop him it cost me \$9.50 and I did not sell him after all.

A recent issue of the *Graphic* of this city is devoted largely to Louisville, Ky., with illustrations representing some of the principal business establishments, and articles relating to the city, its manufactures, business, &c. Among these il-

lustrations are some of the Hardware house of W. B. Belknap & Co., the front of their store being shown and a view of their sample room given. In the article relating to the house, their prominent position among Hardware jobbers of the Middle and Southern States is alluded to, and a reference made to the various departments of their business. As referring to the position which jobbing houses occupy in the Hardware trade, the following extract from the article may be of interest:

Among the best evidences of Louisville's growth, prosperity and expanding trade is the development of a better class of jobbing houses. Manufacturers have multiplied surely, and are increasing in variety and magnitude, but concurrent with this go the jobbers or the great distributors of goods, quite as essential in the second place as are those who manufacture in the first. Large stocks of goods in the hands of wholesale houses tide over times of suspension of manufacturing and afford a supply to the consumer when it could not be otherwise had. In short, jobbing houses are the grand reservoirs of over supply in times of excessive production and main sources of distribution when the supply runs short of the country's needs, exerting thus a conservative force of inestimable value. So much for generalities.

Items.

Simmons Hardware Company, St. Paul, Mo., have issued their fall catalogue. It is devoted to Skates, Sleds, Sleigh Bells, Boys' Wagons and Wheelbarrows, Fire Goods, Ice Tools and Lumbering Tools. The Ice Tools which are tastefully exhibited on page 30 are those manufactured by Wm. T. Wood & Co., for whom the house are Western agents. A complete line of the goods is carried in stock. The company have also recently taken the agency for the Champion Lumbering Tools, some of the leading patterns being illustrated. It is stated that special catalogues of the Ice Tools and the Lumbering Tools will be sent to those who desire them. As evidence of the enterprise of the house and the completeness of their establishment it is to be noted that the catalogue has been printed by them in their own printing department.

Kingman & Co., Peoria, Ill., and St. Louis, Mo., issue a handsome catalogue of more than 200 pages, in which they illustrate their extensive line of Farm Machinery, Wagons, &c. It opens with a list of their principal agencies, including the Moline Plow Company, Moline, Ill.; Stoddard Mfg. Company, Dayton, Ohio; Marcellis Mfg. Company, Marseilles, Ill.; Vandiver Corn-Planter Company, Quincy, Ill.; Russell & Co., Massillon, Ohio; Milburn Wagon Company, Toledo, Ohio, and Fish Bros. Wagon Company, Racine, Wis. They have also a warehouse in Kansas City, Mo.

Palmer Hardware Mfg. Co., Troy, N. Y., issue circulars of King's Patent Adjustable Bit Gauge and King's Improved Sash Support and Bolt, which they are putting on the market.

McIntosh, Huntington & Co., Cleveland, Ohio, issue a number of new pages for their catalogue. They relate to Locks, Vises, Registers and Door Springs.

Edward Kirby & Co., commission merchants, Alexandria, Egypt, have added to their business a tourists' office, and they are making arrangements to convey travelers up the Nile, also to Palestine, Constantinople and other points.

John Pritzlaff Hardware Company, Milwaukee, Wis., have issued a price current devoted to Axes, Cross-Cut and Wood Saws,

Lumbering Tools, Hay Knives, Stove Boards, Meat Cutters, Skates, Sleigh Bells and other seasonable goods.

The death of Phineas S. Hadger, secretary of the E. D. Clapp Mfg. Company, Auburn, N. Y., occurred on the 25th ult. The funeral was attended Monday, 29th ult., from his late residence in that city.

The Yale & Towne Mfg. Company have most handsomely fitted up their new Chicago office and salesroom at 152 and 154 Wabash avenue. The room is very wide and deep, giving them most spacious quarters, and affording ample opportunity for a tasteful arrangement of their several departments, as well as a very striking display of their goods. The cabinets have not yet been completely furnished with the samples which are to occupy and adorn them, but enough has been done in this line to enable the visitor to form some conception of the artistic possibilities in a display of Builders' Hardware. It is expected that the stock will be completely arranged at an early day, when a more detailed description of this establishment will be given. The company propose to make it one of the finest salesrooms for Builders' Hardware in America.

The Lissberger Metal Company have established an office and salesroom at 21 West Lake street, Chicago. They are manufacturers of Plumbers' and Tinnerns' Solder, and of Stereotype, Electrotype and Babbitt Metals; also smelters, refiners and dealers in Ingot Copper, Pig Lead, Pig Tin, Antimony, &c. Their works are in New York. The Chicago representatives of the company are M. J. & J. D. Lissberger.

Chase & Churchill, an old and well-known firm of high standing, at Weeping Water, Neb., have sold their Hardware business to Sackett & Amerman. The purchasers are old residents of that place, and are understood to have abundant means to carry on the business. Chase & Churchill will continue in the Crockery trade, having hitherto been interested in both Crockery and Hardware.

In the item relating to the manufactures of the F. B. Harkins Foundry Company, Bristol, Pa., in our issue October 25, the address was incorrectly given as Bristol, Conn. The trade will please to note the correction, as it may have led some of them to address letters erroneously.

G. & H. Barnett, Black Diamond File Works, Philadelphia, have been awarded a silver medal for the best Files and Rasps by the Centennial Exposition of the Ohio Valley and Central States at Cincinnati.

Tendencies in Trade.

The following letter, from a Missouri Hardware house, while referring to the increase of direct dealings between the merchant and manufacturer, alludes to the important place filled by the jobbers as distributors of goods:

In our opinion there are more goods sold direct from the manufacturers to the retailers than there were one or five years ago, and there seems to be a general tendency in that direction; but we think it will never become universal, as, in one sense, the jobber is as necessary to the trade as the manufacturer or retailer. There are several reasons on which we base our opinion, one or two of which we give, as follows: Retailers are getting educated to the idea that it is better to order often and in smaller quantities, which does not require as much capital in their business as it would to purchase in jobbing quantities in order to obtain the extra discount given by the manufacturers. Another point in favor of the jobber is that they carry in stock a variety of goods usually sold in the retail Hardware busi-

ness, which could not all, nor 10 per cent. of them, be furnished by the general manufacturers of the country, thus making it necessary for the retailer to send out ten orders in order to obtain what he can get through the jobber in one. Not only that; from the jobber he always has such a variety to select from that he can make out an order large enough to make up a freight order, which, for profit, should never be less than 100 pounds shipping weight, as the railway companies charge as much for 10 or 50 pounds as they do for 100 pounds, and then the goods in the hands of the jobbers are at points nearer to the retailer, which assures him less freight and greater promptness in receiving his goods, and the small per cent. taken by the jobber is but just compensation for the convenience and advantage the retailer and consumer derive from receiving their goods in small quantities and the time saved in obtaining them.

From a gentleman who has exceptional opportunities for observing the tendencies of trade we have the following, in which it will be seen that the opinion is expressed that jobbers are more than holding their own:

It was my impression six months ago that the jobbers were losing their grip on the large trade, which was going to manufacturers. But my opinion now is that the large retailers do not care to pay a premium for the privilege of buying goods of manufacturers, and they seek to buy in the cheapest market and the large jobbers are doing more business than ever in their history, and I see no reason why they will not continue to have the same experience right along. It is an advantage to a buyer to place his orders with a jobber for many reasons, among which may be mentioned that they are filled quicker and he can order many lines of goods from the same concern, while in buying from factory he is often compelled to buy more than his trade demands to make an order of sufficient volume to justify separate shipment. Jobbing houses are extending their lines constantly to meet the wants of the trade.

The letter printed below from Minnesota compares the experience of our correspondents with that of F. B. Straub & Co. as represented in their table recently published:

We were particularly interested in the table as prepared by Fred. P. Straub & Co. in *The Iron Age*, October 11. It shows a systematization rarely found among retailers. While we cannot give percentages, we know full well that our trade with the manufacturers is increasing as against the jobbers. As to the Eastern manufacturers gaining over the Western, we hardly think it is true in our case. We think the West is holding its own.

Referring to the proportion of purchases from the manufacturers and jobbers, respectively, a Hardwareman in this State writes:

I have never kept any exact account of the proportion of purchases made from manufacturers as separated from jobbers, but should think in Hardware it would be four-fifths; in Carriage-makers' material, as Wagon Tire, Springs, Wheels, Spokes, Rims, &c., the whole; in Tinware the whole; in Woodenware pertaining to House-Furnishing goods nearly all from the jobbers; in Brushes about half from each. I purchase where I can find the best goods for the money. Do not care whether from jobber or manufacturers, but am apt to find more goods with a jobber than a manufacturer.

The following letter from Illinois goes with some detail into the matter of purchasers from jobbers and manufacturers

and alludes to the important place held by the great Western jobbers:

In looking over our invoice book we find that from 1874, when we commenced business, until 1882 we bought nearly all our goods of New York and Philadelphia jobbers and Eastern manufacturers. Such firms as Landers, Frary & Clark, Reading Hardware Company, Sargent & Co., Oliver Bros. & Phillips, Biddle Hardware Company and others sent their men here regularly, and from them we bought a great many goods. But within the last six or eight years they have all quit coming here. Owing to the active competition between the rival cities of Chicago, Milwaukee and St. Louis for trade in this section we have been able to buy as cheap of them as we could in the Eastern markets for such quantities as we buy. The consequence is the Chicago and St. Louis jobbers have driven out their Eastern competitors. As an instance I might mention that a short time ago we wrote to H. Disston & Sons for price on eight dozen Saws. The Chicago jobber sold us the Saws 5 per cent. better delivered than Disston's quotation in Philadelphia. We, of course, buy Nails and Barb Wire in carlots from the manufacturer. Speaking of Nails I would say we have bought all our Nails from Centralia Illinois Mill for the past six years. Formerly bought them in Wheeling or Pittsburgh. With such firms as Simmons Hardware Company, St. Louis, and Hibbard, Spencer, Bartlett & Co., and Horton, Gilmore, McWilliams & Co., Chicago, with their large stocks and varied assortments, the retail merchant in this section who is a close cash buyer can do as well as by going further East and is in less danger of overstocking, as is often the case in buying of the manufacturer who offers a special 5 per cent. for quantities.

A well-known wholesale Hardware house of the Northwest gives the following general view of the situation as seen from their standpoint:

In our opinion the manufacturers each year are reaching a smaller class of trade than ever before, and a great many of them oftentimes sell to smaller dealers as cheap or cheaper than they do to jobbers. This habit seems to be growing and it has got about to the place where, on a great many line of goods, a good large retailer can buy them as cheap as the average jobber does. This, of course, does not seem a fair thing to the jobber, but in our minds it is nevertheless a true state of the case. And while we are glad to see that there are some notable exceptions to the rule, still the tendency is growing more and more the other way.

From a number of letters which we have received from merchants in various parts of the country we extract the following remarks in regard to the question, in which it will be seen that the matter is looked at from different standpoints:

Evansville, Ind.—As far as I observe, there is no change in the retailer's method of buying. All the retailers I am acquainted with, with a few exceptions, buy direct from the foundries or manufacturers. Drummers representing the manufacturers are as numerous as ever. Retailers now send their orders for odd plates for stoves to the jobber, sending also a collection of small broken orders, thus saving the dealer the trouble of writing to different parties and lessening express expenses, and generally these orders are more punctually attended to.

Fenton, Mich.—So far as my experience goes I think that nine-tenths of all the goods are bought from jobbers. There are certain lines of goods bought now and then from manufacturers, such as Nails, Bar Iron, Glass, White Lead, Tinware, &c., but they are now-and-then purchases. Most of the country dealers buy in too small quantities to stock from manufacturers. Our orders are of numerous kinds and quantities and almost daily, so to deal with manufacturers is out of

the question; and then there is no speculative tendency with dealers in laying in stock with an expectation of an advance. Hence the often purchasing for daily wants.

Wellston, Ohio.—From our personal observation we do not find any advantages in dealing direct with the manufacturers, as the jobbers are able to offer the same inducements as the manufacturers. Believe the jobbing business to be on the increase in our locality.

Ithaca, N. Y.—We buy more goods from the manufacturers than formerly. We do not keep a record of the amount we buy from the jobber or manufacturer, but our opinion is that three-fourths of our trade is with the latter. It seems as if the manufacturers are making a greater push than ever to deal direct with the retail trade; they don't like the extreme cutting the jobber indulges in.

Wichita, Kan.—We purchase mostly from jobbing houses, especially Shelf Hardware. Pieced Tinware mostly from manufacturers, while we get most of our Stamped Tinware from jobbers. Granite Ironware we get from jobbers, while Stoves and Nails are bought direct from the manufacturers. Some lines of goods we can purchase cheaper from the jobber than from the manufacturer. Other lines we can purchase cheaper from manufacturers than jobbers. In heavy goods we think we can do better by dealing directly with the manufacturer as a general rule. For instance, purchasing Wheelbarrows from the manufacturer we receive them in better shape than when we get them from jobbing houses, as they are not handled so often.

Springfield, Mo.—Our business is almost entirely jobbing. We intend to and do buy all our goods direct from manufacturers. Cutlery, &c., we import through New York houses. Should think much the larger proportion of our purchases were west of Buffalo, as we buy all staples and heavy goods West, except Burden's Horsehoes. Some Axes, Scythes and Shelf Goods come from New York State and New England.

Cooperstown, N. Y.—So far as my experience goes in regard to purchasing directly from manufacturers, I buy no more goods from them direct than I did five years ago. But a few years ago nearly all my purchases were made from jobbers, but gradually this was changed, and for the last five years nearly all my goods were bought from manufacturers, and the purchases from jobbers are in smaller quantities. I find that I cannot easily get along without the jobber, as my orders are more assorted and I find it very convenient to make up my orders of assorted goods from them.

Willmar, Minn.—I am of the opinion that the table of Fred. P. Straub & Co. is as true a reflection of the general tendency of trade, as between manufacturer and jobber, as it would be possible to produce.

Arrangement of Stores.

The accompanying illustrations, Figs. 289 and 290, relate to a method of managing Glass, as described by H. G. Hall & Son, Boston, Mass. It will be observed that the Glass Rack, which may be di-

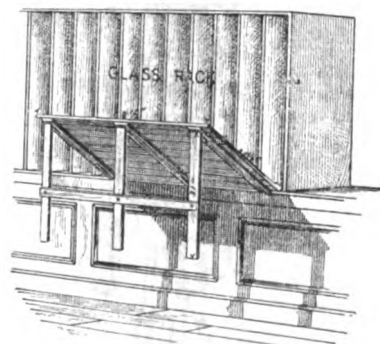


Fig. 289.—Glass Rack and Folding Table.

vided into a greater variety of partitions than are shown in the illustration, is placed upon the counter, and the Glass Board is arranged so that it can be readily placed in position for use, or raised up out of the way so as to rest against the front of the Glass Rack. The illustration, Fig. 289, shows it let half-way down. Fig. 290 represents the face of the Glass Board, which has a raised edge on two sides. Rules

29 and 47 inches, respectively, are set in flush with the face of the board in the manner indicated, thus giving a convenient arrangement for measuring and cutting the glass. The board is attached to the counter by Chest Hinges, the supports or legs in front being attached by

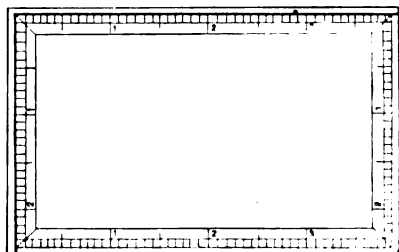


Fig. 290.—Top of Glass Table.

Back Flaps. There is a hook and eye, as indicated in Fig. 289, for the purpose of holding the board close up to the Glass Rack. The entire length of the Glass Board is 48½ inches, and its entire width 30¼ inches.

From F. A. Herrick, who has been for a number of years with Warner & Dodge, Jackson, Mich., we have the description of a rack for displaying Pumps and other goods, which is shown in Fig 291. The rack is made by taking a piece of 4 x 4



Fig. 291.—Method of Displaying Pumps, &c.

timber and beveling the corners and making it of such a length that will reach from floor to ceiling, when it is fastened securely at top and bottom. The first shelf is 34 inches from floor and is made of 1½-inch plank and is 21 inches in diameter, with cleats nailed to the post under the shelf, and four iron braces 18 inches long

underneath running from the outside of the shelving to the post. Holes are bored near the outside of the shelf to let the pipe to the Pumps on the top shelf reach in, so as to hold them in place. The top shelf is made the same as the bottom except that it is 28 inches in diameter. Well Pumps are placed on the top with holes or notches for the pipe to fit in, and, being larger than the bottom, the lower ends of the Pumps fit into the notches on the lower shelf. Cistern Pumps are placed on the lower shelf, as shown in the cut. By this arrangement it will be seen that the lower shelf will easily hold four Pumps and the upper shelf four to six. Near the top of the post a round iron hoop is supported by iron braces attached at the top. On this hoop Lanterns are hung, a wire hook bent around the rod

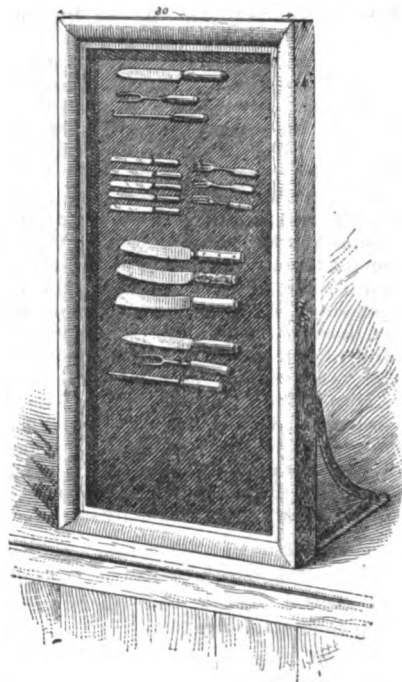


Fig. 292.—Counter Show Case.

being used to attach them. Screw hook are also inserted in the ceiling, making a somewhat larger circle, and from these Lanterns are also suspended, making, it is stated, a very attractive display. This second circle of Lanterns is not, however, shown in the illustration. The economy of space that is thus secured is another feature of this arrangement.

From S. W. Snodgrass, Miffenburg, Pa., we have received the description of the Counter Showcase which is represented in Fig. 292, which he has in use and to the merits of which he refers. The general form and purpose of the case may be gathered from the illustration. The Cutlery is fastened to a door which hinges so as to open whenever a change of goods is desired. The door is trimmed or painted black to secure an effective contrast, and the goods are attached by means of a brass wire or in any other suitable way. The glass in front protects the goods from exposure and handling. This method is referred to as desirable for displaying holiday Cutlery, having one case devoted to Carvers, another to Pocket Cutlery, another for Butcher Knives, another for Shears, &c., but the same method can obviously be used with a varied line of goods. It is suggested that several doors might be made to fit the same case, as they are hung on loose joint butts, thus permitting a change of goods easily and quickly.

Another design of Mr. Snodgrass's is shown in Fig. 293, which represents a method of displaying and accommodating

Saws. From the illustration it will be seen that the shelving in which the stock is held extends to the height of 54 inches from the floor, there being above a case, in which, on a black background, Saws are exhibited the entire height of the structure from floor to ceiling. The Saw case thus occupies the vacant space usually above shelving, which in this way is put to good use, giving an effective display and adding much to the general appearance of the store. The drawers in the upper part of the shelving are devoted to Back Saws, Hand Saws, &c. The manner in which the Cross-Cut Saws are placed in the lower and larger divisions is indicated in the engraving.

Exports.

BY SHIP JOAQUIN, OCTOBER 13, 1888, FOR SIDNEY, N. S. W. (Continued).

By McLean Bros & Rigg.—5½ dozen Locks, 13 dozen Bench Screws and Mouse Traps, 104 dozen Pulleys, 4 dozen Wringers, 46 dozen Axes, 1 dozen Pumps, 12 dozen Screw-Drivers, 6 Guns, 18 Clocks, 24 dozen Hammers, 31 dozen Saws, 48 sets Axes, 12 dozen Axes, 13 cases Agate Ware, 9000 Bolts, 2 dozen Vises, 20 dozen Washboards, 35 dozen Axes, 11,000 Bolts, 3 dozen Match Boxes, 30 dozen Handles, 5 dozen Hammers.

By Strong & Trowbridge.—4 cases Hardware, 2 cases Picks, 10 cases Hardware, 1 case Nails, 1 case Locks, 3 cases Hardware and Cutlery, 6 cases Firearms, &c., 1 case Hardware, 1 case Lampware, 5 cases Cartridges, 2 cases Hardware, 1 case Cutlery, &c., 1 case Carriage-Ware, 25 cases Axes, 1 barrel Glue, 55 cases Axes, 1 case Nails, 2 cases Wringers, 2 cases Hardware, 1 barrel Pulleys, 40 cases Axes.

By V. Basanta.—6000 packages Tacks, 784 pounds Nails, 5 gross Rat Traps, 6 dozen Cranks and Rollers, 3 dozen Well Wheels, 6 gross Rat Traps, 10 dozens Axes, 6 Clocks, 10 dozen Shovels, 1½ gross Hat Racks, 12 Rifles, 200 Clocks, 114 dozen Slaters, 60 dozen Shovels, 5 gross Wire Goods, 54 Rifles, 2 cases Ammunition and Tools, 40 gross Fruit

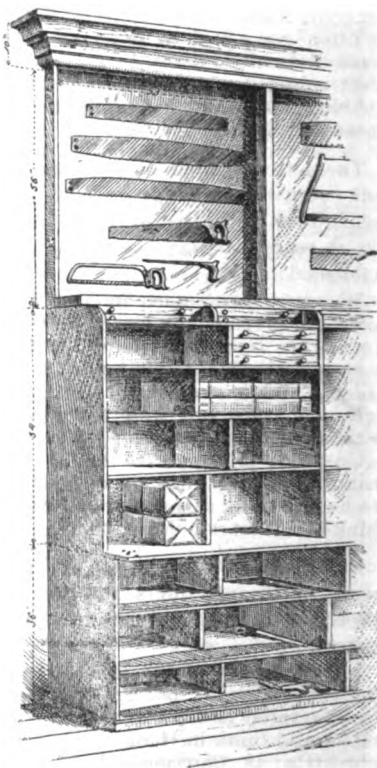


Fig. 293.—Saw Case.

Jars and Trimmings, 17 dozen Axes, 22 dozen Wrenches, 12½ gross Axle Grease, 13 Clocks, 50 Lamps.

By R. W. Cameron & Co.—53 crates Fruit Jars, 11 cases Hardware, 1 case Whips, 12 boxes Hardware, 8 crates Wheels, 2 cases Machinery, 5 cases Hose, 1 case Hardware, 13 packages Hardware, 1 case Whips, 2 cases Whip Handles, 36,861 pieces Roofing Slate.

By Coombs, Crosby & Eddy.—12 dozen Pump Parts, 6 dozen Axes, 2 Corn Shellers, 2 dozen Axes, 15 dozen Handles, 1 dozen Spades, 6 dozen Shade Rollers, 5 dozen Washboards, 6

dozen Axle Grease, 5 dozen Hardware, 7 dozen Hardware, 2 dozen Hoes, 1 gross Stove Polish, 35,000 Cartridges, 20 dozen Edge Tools, 60 dozen Edge Tools, 10 dozen Axes, 39 Churns, 102 Stoves, 4 dozen Picks, 10 dozen Carpenters' Tools, 10 dozen Bird Cages, 2 dozen Wringers, 2 dozen Lawn Mowers, 15 dozen Hammers, 168 pounds Oil Stone, 672 pounds Nails, 9 dozen Hardware, 2 dozen Grindstones, 69 dozen Hardware, 31 dozen Edge Tools, 20 gross Stove Polish, 5 dozen Carpenters' Tools.

By Arkell & Douglas.—300 dozen Handles, 1 dozen Perambulators, 3 dozen Shellers, 6 dozen Handles, 200 dozen Tools, 11 dozen pairs Roller Skates, 10 dozen Tools, 40 dozen Hammers, 1 gross Rat Traps, 3 dozen Shellers, 18 cases Carriage-Ware, 3 dozen Hay Knives, 32 dozen Tools, 72 dozen Handles, 3 dozen Corn Mills, 24 dozen Saws, 11 dozen Forges, 12 dozen Axes, 6 dozen Grindstone Fixtures, 784 pounds Hardware, 38 pounds Hardware, 18 dozen Squeezers, 15 dozen Axes, 18 dozen Brushes, 504 dozen Handles, 55 dozen Washboards, 1016 pounds Hardware, 20 Corn Mills, 88 dozen Hardware, 40 dozen Shovels, 35 dozen Axes, 3 dozen Churns, 85 dozen Whips, 20,000 Cartridges, 30,000 Primers, 590 pounds Hardware, 6 gross Blacking, 755 pounds Castings, 100 dozen Whips, 13½ dozen Harness, 4 dozen Brushes, 138 pounds Wagon Springs, 24 dozen Braces, 10 dozen Bird Cages, 1 dozen Air Guns, 898 pounds Hardware, 36 dozen Hoes.

By W. H. Crossman & Bro.—2 Drilling Machines, 96 dozen Mouse Traps, 50 dozen Shovels, 1 dozen Vises, 1 case Tinsmiths' Tools, 12 dozen Mop Holders, 100 Clocks, 2 dozen Grindstone Fittings, 1 dozen Wringers, 2 dozen sets Reloading Tools, 70,000 Primers, 30,000 Cartridges, 12 dozen Bird Cages, 6 dozen Rolling Pins, 10 dozen Potato Mashers, 1 dozen Vises, 2 dozen Meat Cutters, 690 dozen Files, 2635 pounds Nails, 1 dozen Stove Trucks, 1 dozen Washers, 75 boxes Axes, 75 dozen Hatchets, 62 dozen Picks, 12 dozen Carpenters' Tools, 6 cases Hardware, 5 cases Carpenters' Tools, 3 packages Lamp Goods, 412 pounds Oil Stone, 1 dozen Wringers, 2 cases Hardware, 4 dozen Picks, 7 Scales, 18 dozen Washboards, 2 packages Carpenters' Tools, 6 dozen Cow Bells, 12 dozen Mouse Traps, 16 dozen Hatchets, 336 pounds Oil Stone, 1 case Chalk Lines, 20 dozen Axes, 36 dozen Files, 2 dozen Corn Shellers, 110 dozen Shovels, 50 dozen Washboards, 6 dozen Grindstone Fittings, 2 dozen Meat Cutters, 1 dozen Lawn Mowers, 10 packages Carpenters' Tools, 4 cases Hardware, 4½ dozen Sad Irons, 56 Corn Shellers, 3 dozen Stove Trucks, 5 dozen Wringers, 1½ dozen Wrenches, 23 packages Lamp Goods, 60 Stoves, 36 dozen Mouse Traps, 3 dozen Fluters, 16 dozen Picks, 28 dozen Hatchets, 4 packages Carpenters' Tools, 3 cases Hardware, 7 crates Carriage-Ware, 1 case Carriage Hardware, 90 dozen Shovels, 2 cases Hardware, 5 dozen Axes, 3 cases Carpenters' Tools, 1 dozen Guns, 18 sets Reloading Tools, 60,000 Primers, 10,000 Cartridges, 5 dozen Bird Cages, 1 dozen Perambulators, 1 case Tinsmiths' Tools, 30 dozen Mouse Traps, 96 dozen Handles, 6 dozen Wrenches, 10 dozen Mop Holders, 6½ dozen Saws, 5 dozen Thermometers, 5 dozen Bush Hooks, 560 pounds Nails, 18 dozen Picks, 80 dozen Axes, 30 Guns, 30 sets Reloading Tools, 100,000 Primers, 6 dozen Files, 2 dozen Tills, 6 dozen Shovels, 24 nests Pails, 1 case Hardware, 8 cases Carpenters' Tools, 20 dozen Handles, 4 dozen Picks, 940 pounds Tacks, 9 dozen Razor Strops, 235 pounds Oil Stone, 20 dozen Shovels, 20 dozen Handles, 24 Guns, 30,000 Cartridges, 3 dozen Tills, 10 dozen Axes, 8 packages Hardware, 2 cases Carpenters' Tools, 27 cases Hardware, 195 packages Carriage-Ware.

PER BARK MATHILDE HEMING, OCTOBER 15, 1888, FOR LYTTELTON, NEW ZEALAND.

By H. W. Peabody & Co.—13 packages Hardware, 3 packages Agricultural Implements, 3 packages Lampware, 72 dozen Handles, 2 dozen Razors, 42 packages Carriage-Ware, 20 packages Hardware, 105½ dozen Handles, 1 case Plated-Ware, 1 case Agricultural Implements, 5 cases Stone, 4 cases Wringers, 13 packages Hardware, 6640 pounds Nails, 1 case Flint Paper, 3 packages Hardware, 5 tons Twine, 50 dozen Handles, 40 dozen Handles, 10 dozen Shovels, 14 packages Hardware, 1375 pounds Horse Nails, 15 packages Stoves and Wicks, 20 dozen Shovels, 132 dozen Handles, 8 cases Wringers, 1 bundle Whetstones.

By Coombs, Crosby & Eddy.—2 dozen Hatchets, 5 dozen Washboards, 5 dozen Brooms, 1 dozen Shovels, 29 pounds Twine, 16 Blocks, 7 dozen Carpenters' Tools, 5 dozen Edge Tools, 7 dozen Lamp Goods, 1 dozen Oil Stoves.

By R. W. Forbes & Son.—40 packages Hardware, 475 pounds Horse Nails, 16 packages Stoves, 1 dozen Mallets, 1 case Forges, 711

pounds Carriage Bolts, 21 dozen Hammer Handles, 1 case Plated-Ware, 2 dozen Sash Cord, ½ gross Egg Beaters, ½ dozen Store Trucks, 2 dozen Sad Iron Handles, 7 packages Hardware, 4 cases School Slates, 1 case Agricultural Implements, 1 case Carriage Hardware, 20 cases School Slates, 1 case Carriage Hardware.

By Arkell & Douglas.—4 dozen Axes, 12 dozen Locks, 8 dozen Pumps, 15 pounds Sash Cord, 1 dozen Braces, 30 dozen Handles, 3 dozen Saws, 12 dozen Hammers, 1 dozen Wringers, 26 dozen Locks, 192 dozen Handles, ¼ dozen Mills, 10 dozen Shovels, 24 dozen Axes, 12 dozen Picks, ½ dozen Mangles, 8½ dozen Hog Rings, 1205 pounds Bolts, 1 case Drills, 700 pounds Horse Nails, 116 pounds Wagon Springs, 6 dozen Hinges, 3 dozen Churns, 4½ dozen Blocks, 6 dozen Molasses Gates, 2 dozen Lamp Goods, 2 dozen Mallets, ¼ dozen Cultivators, 31 dozen Lampware, 4 dozen Axes.

By A. Field & Co.—156 pounds Malleable Castings, 30 sets Rims.

By Charles Brewer & Co.—7 cases Carpenters' Tools, 4 cases Handles, 1 case Hardware.

By Healy & Earl.—4 boxes Reaper Extras.

By Dunbar, Hobart & Co.—3860 pounds Nails.

By D. D. Pratt.—600 gross Chalk Crayons.

PER BARK ALICE REED, OCTOBER 18, FOR DUNEDIN, NEW ZEALAND.

By H. W. Peabody & Co.—21 packages Hardware, 3360 pounds Axle Grease, 4 packages Lampware, 8 packages Carriage-Ware, 33 packages Stoves, 1 case Wood-Working Machinery, 40 dozen Handles, 10 dozen Shovels, 250 pounds Twine, 75 boxes Horse-Nails, 3 cases Hardware, 600 pieces Stoves, 1 case Flint Paper, 204 pounds Wire, 125 dozen Brooms, 7 cases Hardware, 65 cases Hardware, 4 cases Churns, 8860 pounds Bolts, 62½ sets Axes, 33 packages Carriage-Ware, 1 case Machinery, 2 cases Brooms, 10 dozen Shovels, 4 cases Agricultural Implements, 4423 pounds Axle Grease, 26 packages Tacks and Nails, 4 cases Wringers, 42 dozen Handles, 28 packages Stoves, 1 case Pumps, 4 packages Lampware, 22,400 pounds Wire.

By Chas. Brewer & Co.—23 cases Handles, 1 case Hardware, 7 cases Agricultural Implements, 10 cases Nails, 16 cases Tools, 1 Chain Pump, 3 cases Scales, 1 case Hardware, 1 case Flint Paper, 1 case Handles, 1 case Tools, 3 cases Carriage Hardware, 1 case Handles, 11 cases Hardware, 1 case Sandpaper, 1 case Tools, 17 cases Nails, 1 case Mangles, 1 case Nails, 1 case Tools, 9 packages Creamery Goods, 43,055 pounds Wire, 8877 pounds Wire, 2 cases Agricultural Implements, 8 cases Nails, 10 cases Hardware.

By Arkell & Douglas.—2000 spokes, 3 dozen Whiffletrees, 36 sets Hubs, 100 pounds Carriage Hardware, 200 pounds Hardware, 3 dozen Harness Hardware, 36 dozen Whip Handles, ¼ dozen Mallets, 12,984 pounds Barb Wire, 11,200 pounds Barb Wire, 2 dozen Hay Knives, 10 dozen Shovels, 70 dozen Handles, 1 dozen Wringers, 1 Scale, ¼ dozen Wheels, ¼ dozen Drills, 4 packages Lampware, ½ dozen Ranges, 1 case Carriage-Ware, 39 sets Rims, 112 pounds Nails, 20 dozen Lampware, 3 cases Hardware.

By W. H. Crossman & Co.—8 packages Lamp Goods, 3 cases Slates, 2 gross Fruit Jars, 18 dozen Handles, 52 dozen Clocks, 8 cases Plow Parts.

By Strong & Trowbridge.—1 case Hay Forks, 1 case Wringers, 2 cases Hatchets, 1 case Wrenches, 1 case Pumps, 1 case Brace Bits, 1 case Hammers, 1 case Axle Grease, 1 case Nails, 1 case Handles, 6 cases Handles, 1 case Hardware, 2 cases Axes, 1 case Pumps, 1 case Whetstone, 5 cases Hardware, 1 case Paint Mills, 2 cases Carriage-Ware, 8 cases Nails, 1 Bale Twine, 7 cases Hardware, 2 packages, 1 case Hardware, 1 case Hardware, 9 packages Lampware, 7 cases Hardware, 1 case Forks, 1 case Saws, 3 packages Churns.

By W. K. Freeman.—10 cases Grease, 6114 pounds Horse Nails, 624 pounds Hardware, 10 crates Churns, 400 pounds Bolts, 828 pounds Axes.

By R. W. Forbes & Son.—5 packages Axes, 200 pounds Horse Nails, 120 dozen Axe Handles.

By R. W. Cameron & Co.—1 case Cutlery, 1 box Castings, 2 boxes Carriage Hardware.

By A. Field & Co.—18 dozen Toys, 12 gross Tinware, 7 dozen Fire Sets, 6 dozen Shovels, 5 dozen Mouse Traps, 4½ gross Tinware, 1 dozen Tools.

By New Haven Clock Company.—1 case Clocks.

By Ansonia Clock Company.—25 boxes Clocks, 23 boxes Clocks, 44 boxes Clocks.

By A. S. Lascelles & Co.—2 cases Crayons, 15 packages Lampware, 9 pairs Skates.

By Slover & Tyler.—14 packages Cordage.

By B. W. Hartman.—37 cases Nails.

By Welsh & Lea.—12 cases Handles.

On the Chemical Processes Involved in the Rusting of Iron.*

In this short paper there is, so far as I know, no new fact described. I believe everything, or nearly everything, in it is to be found in the records of chemical research; but as I find that the process involved in the rusting of iron is often misunderstood, and that the known facts have not been put together in their connection, I have thought it might be worth while to do so. My attention was first called to the subject by observing what happens when a drop of rain falls on a clean bright surface of iron. At first, for a short time, the drop remains clear, and the bright surface of the iron is seen through it; but soon a greenish precipitate forms in the drop, and this rapidly becomes reddish-brown. The brown precipitate does not adhere to the iron, but is suspended in the water, and becomes a loosely adherent coating only when the water has evaporated. I may premise, that in speaking of rusting, I mean the formation of rust on the surface of metallic iron exposed to ordinary atmospheric conditions. I do not intend to treat of the corrosion of iron by substances such as sulphuric or sélphurous acid, hydrochloric acid, or any other occasional impurities which may be present in the air. It has been conclusively shown that the necessary conditions of rusting are: (1) metallic iron, (2) liquid water, (3) oxygen and (4) carbonic acid, both the latter being dissolved in the liquid water. Iron remains quite free from rust in an atmosphere containing oxygen, carbonic acid and water vapor, as long as the water vapor does not condense as liquid water on the surface of the iron.

Let us consider now the action on iron of the three substances, liquid water, oxygen, carbonic acid, singly, and then two and two. Liquid water, quite free from dissolved gases, does not act on iron at ordinary temperatures. At high temperatures, very rapidly at a red heat, iron is oxidized by water or water vapor, and is converted into the magnetic oxide of iron. This magnetic oxide is formed on the surface of the iron as an adherent coating, and only when it is detached can the water gain access to the lower layers of the iron. Oxygen gas alone does not act at ordinary temperatures on iron. At high temperatures it also converts the iron into the magnetic oxide, which forms an adherent coating. The same is the case with carbonic acid gas, acting alone. At ordinary temperatures it is without action. At high temperatures the carbonic acid is reduced to carbonic oxide, and the iron is oxidized to magnetic oxide, which forms an adherent coating. Liquid water with oxygen dissolved in it does not act at ordinary temperature on iron. This is shown by the fact that ordinary water exposed to the air does not rust iron if the water contains a substance such as lime, or caustic alkali, capable of combining with carbonic acid and itself without action on iron. As long as the lime or caustic alkali is there no rusting occurs. When the lime or caustic alkali has been converted by the carbonic acid of the air into carbonate, then, and not till then, can the carbonic acid of the air dissolve as such in the water, and then, and not till then, does rusting begin. Water containing carbonic acid dissolved in it acts on iron at ordinary temperatures, forming ferrous carbonate, which dissolves in the carbonic acid water, forming, no doubt, ferrous bicarbonate. In this way artificial chalybeate water has been prepared by shaking up finely divided iron with carbonic acid water. In this action hydrogen gas is

* Paper presented by Prof. A. C. Brown at the Edinburgh meeting of the British Iron and Steel Institute.

given off. Solutions have been thus prepared containing nearly one-tenth per cent. of iron. If oxygen is present dissolved in the water it will unite with the nascent hydrogen, and if we have sufficient water, iron and carbonic acid, the whole of the dissolved oxygen will be thus consumed. The presence of dissolved oxygen quickens the solution of the iron, the tendency of the oxygen to combine with the nascent hydrogen supplying an additional motive to the action.

Probably in ordinary rusting no hydrogen actually becomes free, as under ordinary conditions there will always be enough dissolved oxygen to convert all the nascent hydrogen into water. When a solution of ferrous bicarbonate is exposed to an atmosphere containing neither free oxygen nor carbonic acid it loses carbonic acid, and insoluble ferrous carbonate is precipitated. If free oxygen is present in the atmosphere to which it is exposed the ferrous carbonate is oxidized into ferric hydrate, carbonic acid being given off. This, if the water is not already saturated with carbonic acid, dissolves in the water. We can now follow the whole process of rusting and divide it into stages—these stages being really separable, if we take proper precautions,* but in the usual case overlapping one another. We have (1) the formation of soluble ferrous bicarbonate; (2) the conversion of ferrous bicarbonate into ferric hydrate, the white ferrous carbonate passing through green and black intermediate substances into the reddish-brown ferric hydrate—i.e., rust. We have to note that the carbonic acid dissolved in the liquid water, which is necessary for the process of rusting, is not used up in the process. It is given off during the oxidation of the ferrous bicarbonate to ferric hydrate, and is thus ready to act on the new surface of the metallic iron. The continuation of the process of rusting is not therefore dependent on new carbonic acid absorbed from the air, but the original carbonic acid, if not removed, can carry on the process indefinitely, as long as liquid water is present, and oxygen is supplied from the air. Once the process is started it goes on more rapidly, because the porous rust not only does not protect the iron, but favors, by its hygroscopic character, the condensation of water vapor from the air as liquid water. A piece of iron, therefore, which has begun to rust will continue rusting in an atmosphere not saturated with water vapor, an atmosphere in which a piece of clean iron will not rust, because liquid water will condense on the hygroscopic rust from such an atmosphere, but not on the bright iron.

The copper wire department of the plant of the Hartman Steel Company, Limited, at Beaver Falls, Pa., is being operated to its full capacity, with plenty of orders on hand.

Messrs. James W. Queen & Co., of Philadelphia, Pa., have just issued a special catalogue devoted to chemical apparatus, assayers' materials and general laboratory supplies. The publication is undoubtedly one of the most complete of the kind that we have seen, and to the scientific worker will be of considerable value and convenience. A large number of illustrations are given of different appliances in current use, together with sizes, prices and, in some cases, brief descriptions. On one of the opening pages of the catalogue we notice a somewhat peculiar announcement to the effect that the catalogue will be mailed upon application to any address on receipt of 50 cents, but it is explained immediately after that this will be deducted from the first purchase amounting to \$10 or more, so that practically the catalogue will be delivered free of charge.

Fire-Proof Buildings.

The value of fire-proof buildings in a large city is certainly a question well worthy of consideration as regards its bearing upon fire-insurance interests and the reduction of losses. Not only impervious to fire from within, they offer in case of large conflagrations an equally effective barrier to the passage of the flames in their destructive course. The natural stages of growth through which a city has to pass in the course of its natural development is essentially the same. First the gathering of a few humble cottages, then the post office, general store, &c., until the aggregation of numbers swells into, first, the village, then the town or city. Some may take longer to develop than others, but the steps noted are essentially the same. Naturally, at the outset no restrictions could be placed upon the first settlers as to precautions against fire in the erection of their homes. For the most part the latter are humble in the extreme and in the event of loss could be easily replaced at no great expense. The community interest—that arising from the contiguity of buildings—does not exist until a later period, when the land has grown so valuable that buildings adjoin. Business blocks at the outset are built of wood, on the score of cheapness, but as the town prospers new buildings of brick or stone begin to make their appearance; and, like the strata in the rocks, the different types of wood, brick and stone structures mark the eras of a city's growth. Old as is New York City, this is also true in regard to it, and sandwiched in among some of its most substantial and solid business edifices can still be seen here and there the gable-roofed frame building put up many years ago for a farmhouse.

It is evident, then, that the fire-proof building is the outcome of the higher evolution of cities. A certain combination of factors are needed before such buildings can be reasonably looked for. A city can protect its interests to some extent by building ordinances which forbid the erection of frame structures within certain limits, but it cannot specify as to the expense an owner shall go to in construction. He may put up a brick building, keeping just within the limit of the law, and yet have a structure that is just as easily destroyed as the prohibited frame. Such buildings are put up purely for speculative purposes, and the builder has no interest in them save as to the extent of profit the transaction will yield. The great objection to the general introduction of fire-proof buildings is their much higher cost. This has been lessened to some extent by the introduction of new and cheaper fire-proof materials, but there is still ample room for further improvement. The average property-owner is guided in his choice of a building by the item of interest to be returned upon the capital invested. As a rule, it is the wealthy corporations, or individuals, who are content with a fair rate of interest: that can be relied upon as permanent who indulge in fire-proof buildings. There is not a structure of this description in New York City that has not been constructed by one of these classes, and the rule doubtless holds good everywhere. No laws or municipal ordinances can ever be effective in dealing with the fire danger other than in requiring certain conditions in building as a matter of precaution, such conditions being merely the avoidance of known sources of danger in construction. The fire-proof structure, if absolutely fire-proof, would require no insurance whatever; but there is the added cost of erection, the interest on which must be taken into account when the saving in fire premiums is to be calculated. The same rule also holds

good in regard to buildings supplied with automatic devices for the suppression of fires. The cost of the plant and the interest thereon must not be forgotten. This is exemplified in the case of the mill mutuels.

It is evident, then, that the sporadic erection of fire-proof buildings can have but little effect upon the cost of insurance to the general public. Not until such buildings become so general as to have an effect upon the hazard, by materially lessening the danger of a fire spreading, would it be worth while to take them into consideration in the matter of reducing premiums—the more so as these buildings paid no premiums for protection themselves, and consequently were not a source of profit to the companies. In point of fact, a great many buildings supposed by their owners to be fire-proof are far from being such. A building to be fire-proof in the true sense of the word is one in which the materials are actually impervious to the action of fire. The conflagration in Chicago proved that so-called fire-proof buildings were actually worthless when put to the test. Iron fronts curled up like paper under the fierce heat. Granite blocks cracked and split apart under the same influence, leaving the contents of the building quickly exposed to the devouring element. It would seem, then, that the study of the future of the various building materials employed and their value from the underwriters' standpoint in determining the rate to be charged would be well worthy of careful attention in connection with the inspection of buildings at the time of their construction. Fire insurance, like many other branches of business, has been brought to such a point through close competition that it requires the greatest skill in management to yield a fair return on the money invested. The careful study of questions connected with the business that were formerly considered as not worth noticing will at the present day often determine the result of a net gain or actual loss at the end of the year.

The D. Moore Company, Limited, of Hamilton, Ont., favor us with one of the 1888-89 wholesale price lists of their manufactures. The catalogue is a convenient-sized pamphlet, bound in cloth, and a feature that commends itself especially, is the ledger indexing, by means of which the quickest reference may be made to the contents. To show the character and extent of the goods enumerated, we will repeat the section headings as they appear on the ledger index: Stamped Ware, Spoons, Tinnings' Trimmings, Japaned-Ware, Miscellaneous Goods, Copper and Brass Goods, Wire Goods, Galvanized and Sheet-Iron-Ware, Agate Enamel-Ware, Milk Can and Creamery Can Trimmings, Pieced Tinware, Tools, Machines and Coal-Oil Stoves. The pamphlet is illustrated throughout, and full price lists are given, together with brief descriptive particulars where necessary. A further alphabetical index is provided at the back of the book, while the front page is a discount sheet with a general price list for 1888.

From the Marquette (Mich.) *Mining Journal*, of the 20 ult., we take the following table, showing the shipments by ports up to date this season, in comparison with shipments for the corresponding portion of the two preceding years:

Port.	1888.	1887.	1886.3
Marquette.....	730,238	740,947	779,73
Escanaba.....	1,841,215	1,846,537	1,840,020
St. Ignace.....	102,313	86,930	68,081
Ashland, Wis.,	932,322	988,036	653,294
Two Harbors,			
Minn.....	368,385	357,744	279,941
Total.....	3,974,473	4,020,224	3,121,069

Gould's New Deluge Suction and Lift Pumps.

Fig. 1 of the accompanying illustrations represents the new deluge pump of the Goulds Mfg. Company, Seneca Falls, N. Y., and is designated as their No. 829 in their new catalogue. It is designed for shallow or small vessels of not more

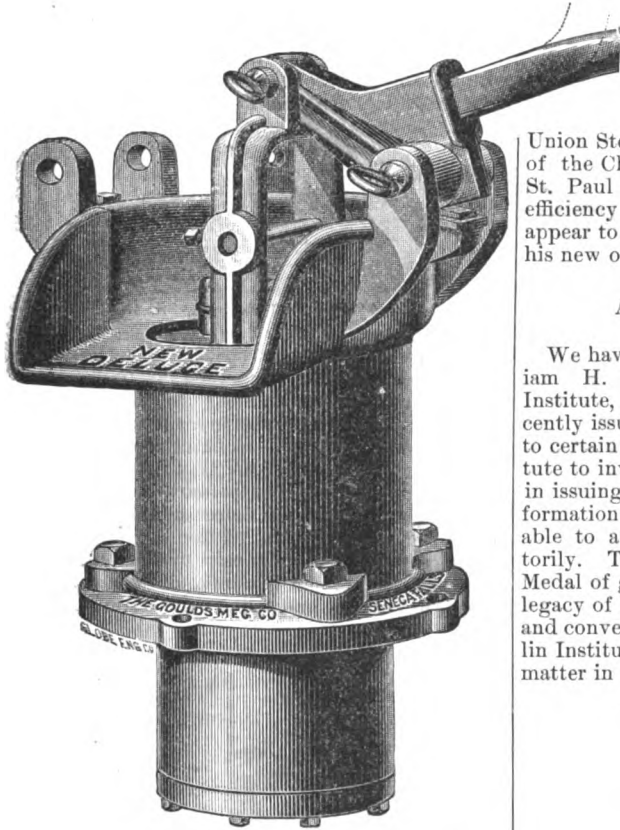


Fig. 1.—New Deluge Suction and Lift Pump.

than 15 to 20 feet depth of hold, for contractors who wish to pump large quantities of water from excavations, and for irrigation where a compact and capacious pump is desirable. The cylinder is lined with brass, the valves rubber faced, and the lever socket made at such an angle that the bent wrought-iron lever when put in one side up is right for ordinary pumping, and by simply changing it to the other side up it becomes a vertical lever. This lever may also be worked from three different points, as shown by the lugs in the cut. The pump has large valves, accessible and removable by hand from above, while to the bottom of the base is bolted a flanged screw which may be for any size of pipe ordered, or changed for other sizes if desired. The pump is made in two sizes, 6 and 8½-inch cylinder with 4 and 6-inch stroke. It is also made with elevated base to be used above deck, or foundation where it is desired to use hose connection, or more convenient to make pipe connections in this manner. Fig. 2 represents the pump with the addition of a heavy forked rod, adapting it for power as well as hand use. This forked rod may be connected to wood rod of wind-mill walking beam or other power, and operated in any place where the water is not more than 25 feet distant for irrigation, excavations, &c. It is also made with elevated base for attaching hose or wrought-iron pipe at side. Fig. 3 shows the pump surmounted with a strongly bolted heavy frame supporting bearing boxes with crank shaft, spur and pinion gears below, &c. The capacity of this pump is from 3000 to 4000 gallons of water per hour.

Myron J. Carpenter, general agent of the Union Steel Company, of Chicago, for

the past year, has been appointed general manager of the Duluth and Iron Range Railroad, over which the Vermillion Range iron ores are taken on their way to market. The *Railway Age* states that few men have had such varied experience in the railway service as Mr. Carpenter, he having been at various times telegraph operator, station agent, shop clerk, store-keeper, traveling auditor, superintendent, agent for freight, &c., during a score of years. The last railway position he held before entering the service of the

Union Steel Company was superintendent of the Chicago Division of the Chicago, St. Paul and Kansas City Railway. His efficiency in previous official stations would appear to be a guarantee of his success in his new one.

Awards to Inventors.

We have received through Mr. William H. Wahl, Secretary of Franklin Institute, of Philadelphia, a circular recently issued in which attention is directed to certain awards in the gift of the Institute to inventors and others. The object in issuing the circular is to make the information more public, and in that way be able to award the medals more satisfactorily. The first is the Elliott Cresson Medal of gold, which was founded by the legacy of Elliott Cresson, of Philadelphia, and conveyed to the trustees of the Franklin Institute. The committee having the matter in charge, after proper investiga-

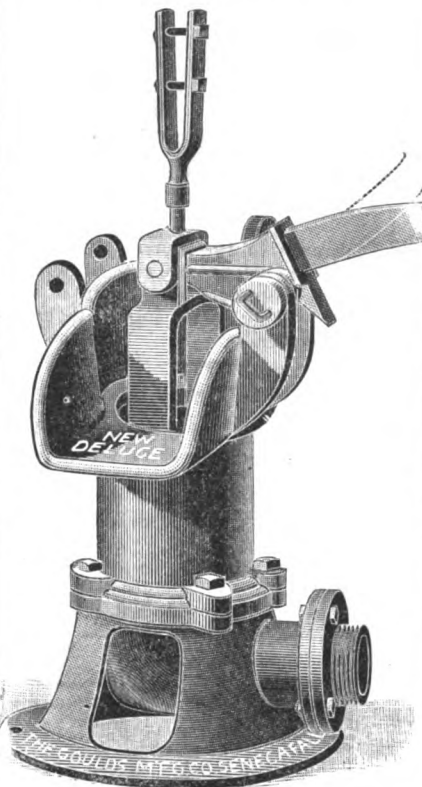


Fig. 2.—Deluge Pump, for Manual or Wind Power, with Side Inlet.

tion, grant the medal either for some discovery in the arts and science, or the invention or improvement of some useful machine, or some new process of combination of material and manufactures, or for the ingenuity and skill of architectural workmanship. In this enumeration it will be seen that a very extensive field is covered, and that applications may properly come from a very great number of sources. The second award is the John Scott legacy, premium and medal, which is \$20 and a medal of copper. This was founded in

1816, the specifications of the donor being "that it should be given to the most deserving." This award is in trust of the city of Philadelphia, but is given under the advice and recommendation of a committee of the Franklin Institute. As it was stated, the circular of Mr. Wahl is to make public these facts, and the object of getting as many applications as possible. Any person interested in these awards, by addressing the Secretary of the Franklin Institute, will receive fuller information respecting the manner of making application, and the Committee on Science and Art will give attention to reports upon

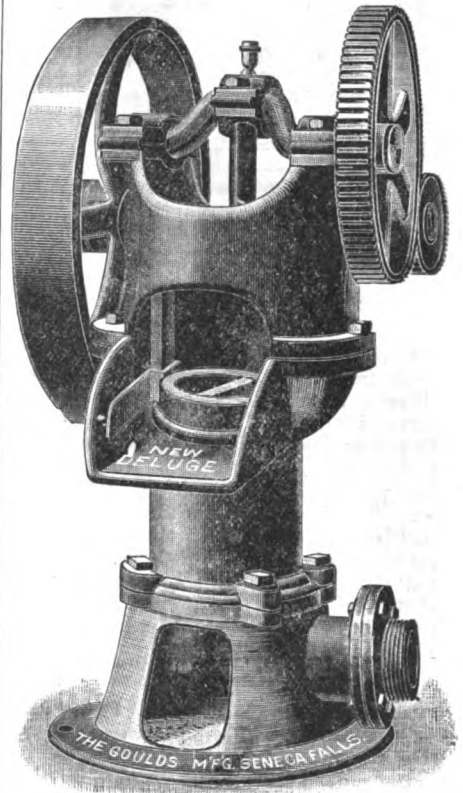


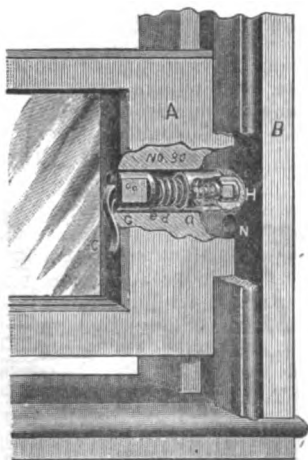
Fig. 3.—Deluge Pump, with Crank, &c., Side Inlet.

discoveries and inventions which may be sent with a view to receiving one or the other of the awards. The conditions of these medals are so very broad that almost every one of an inventive turn of mind has a certain personal interest in them. It is a very simple matter to communicate with the Franklin Institute if any one has a patented device which they think of merit, and we think Mr. Wahl ought to receive a host of communications within a twelvemonth.

King's Improved Sash Support and Bolt.

The accompanying illustration represents this article attached to the sash, a portion of which is removed to show the construction of the Bolt and the method of its operation. The barrel, as will be inferred from the cut, is pressed against the jamb by means of a large spiral spring, D, the object of this pressure being to hold the sash at any desired point and prevent rattling. Through the barrel a bolt passes, which is actuated by a small spiral spring inside the larger spring. This bolt thus acts independently of the barrel, and the office of the spring is to force the bolt into the hole N, and lock the sash when closed. This bolt is connected with and operated by the lever C by means of a rack and pinion movement,

so that it is readily withdrawn when desired. By moving the same lever C upward, the bolt is carried backward to a point where it engages with the barrel, so that by continued lifting on the lever it is drawn in, and its pressure on the jamb

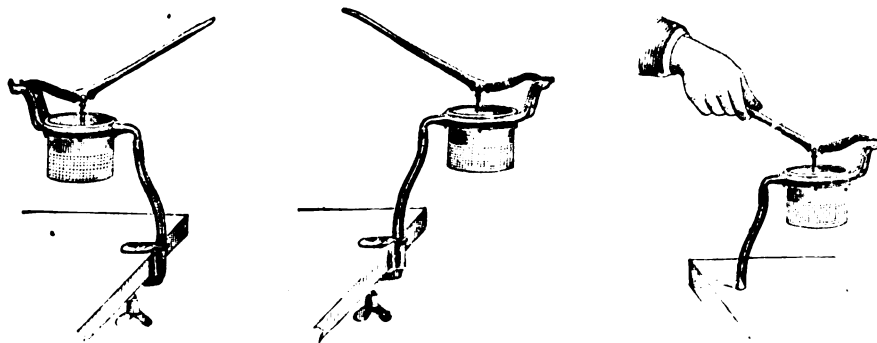


King's Sash Support and Bolt.

relieved, the sash being thus allowed to slide freely. The lever also serves as a lifter in raising the sash. Whenever the lever is dropped, the barrel is again forced against the jamb, so as to hold the sash securely, preventing it from falling. The points made in regard to this article are: That it supports the sash at all points, locking it when closed; that it prevents rattling and does not disfigure the sash; that it is almost entirely out of sight; that it can readily be applied; that it is not liable to get out of order, and is furnished at a moderate price.

Improved Potato Masher, Press and Strainer.

Silver & Co., 56 Warren street, New York, are manufacturing a new upright press for mashing potatoes, pressing fruit, &c. It is represented in the accompanying illustrations, which indicate its general features and the different ways in which it can be used. It will be observed that it is mounted on a support, which can be attached to any table, and in which it is swiveled, permitting it to be used either over a dish on the table or a large



Silver & Co.'s Improved Potato Masher, Fruit Press, &c.

pan or other receptacle off of the table. The cups or strainers are made with openings of different size, according to the use for which they are intended, and they are removable, so as to permit them to be easily cleaned. One fine perforated cup is furnished for jellies, jam, &c., and one coarse perforated cup for potatoes, fruits, &c. The manufacturers allude to the efficiency with which this article does its work and the economy of power connected with its use. Its convenience is referred

to, especially in the fact that it is not necessary to hold it up over the table or dish when in use.

The Cleopatra Hair Curler.

The illustration given below represents a new hair curler which is put on the market by Haff & Walbridge, 76 and 78 Leonard street, New York. The cut gives a general view of the curler, but does not indicate clearly its special feature, which consists in the fact that the iron to which

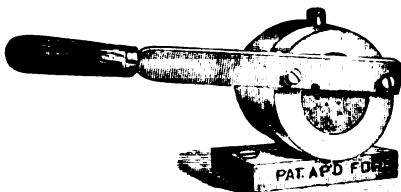


The Cleopatra Hair Curler.

the handle is attached after being heated is inserted in the tube, thus preventing the soiling of the hair or fingers by contact with the iron. The tube in which it is inserted as well as the arm by which the pressure on the hair is obtained is nickel-plated, thus giving an attractive appearance.

Little Giant Wire Cutter.

This article, which is represented in the accompanying illustration, is made by the Collins-Gibbons Mfg. Company, St. Louis, Mo. This tool is referred to as small but very powerful, the cutting leverage being



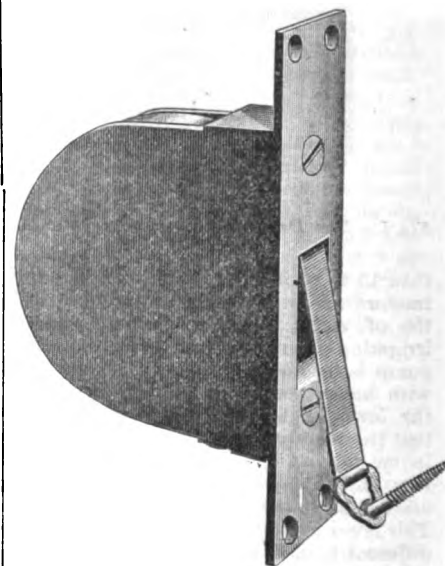
Little Giant Wire Cutter.

almost directly on the center. The tool is referred to as cutting any size of wire up to $\frac{1}{4}$ inch diameter, just as if it were sawed off. There is a gauge attachment with each cutter.

The Caldwell Sash Balance.

A substitute for the ordinary sash cord and weight, possessing certain features of

end of which is shown in the illustration projecting through the opening in the face-plate. By reference to the engraving it will be noticed that there are two screws indicated in the face-plate of the device. By turning these screws the outer edge of the plate is drawn forcibly against the side of the roller or drum, thereby clamping it, as it were, against the fixed side of the plate and holding it with any desired tension. The adjustment is made before the fixture is applied to the casing of the window and causes the roller to run with greater or less friction as may be found



The Caldwell Sash Balance.

wind into the balance. The point at which the loop is attached to the tape is made sufficiently large to prevent that end when released from the window sash from disappearing within the outer casing of the balance. It is claimed for this device that it is applicable not only to window sash, but also to lifting doors, show-cases and similar work. It is so constructed that it may be adjusted to different weights according to the work required of it. While recently introduced to the trade, it has been tested in a number of buildings in Rochester and is being put into others in process of erection. It is well made and is claimed to be durable and economical.

The rivet steel, tests of which were published on page 658 of *The Iron Age*, November 1, was made by the Troy Steel and Iron Company, of Troy, for John Roach.

Japan is supplying herself from England with machinery for the manufacture of cotton and woolen fabrics.

CURRENT HARDWARE PRICES.

NOVEMBER 7, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Perfection, 1000—	
High & Goldmark's	
W. L. Waterproof, 1-10's	50¢
M. B. Trimmings, 1-10's	65¢
M. B. Ground Edge, Central Fire, 1-10's	70¢
Double Waterproof, 1-10's	1.40
Market Waterproof, 1-10's	50¢
S. B.	30¢
Union Metallic Cartridge Co.	
F. O. Trimmings	50¢
P. L. Ground	65¢
Gen. Fire Ground	70¢
Double Waterproof	1.40
Double Waterproof, 1-10's	1.40
S. B. Genuine Imported	45¢
Eley's B. B.	54¢
Eley's B. B. Waterproof, Central Fire	1.60

Cartridges.

Rem Fire Cartridges	dis 50¢
Rem Fire Military	dis 50¢
Central Fire, Pistol and Rifle	dis 25¢
Central Fire, Military & Sporting	dis 15¢
Blank Cartridges, except 22 and 32 cal., an additional 10% over above discounts.	
Blank Cartridges, 32 cal.	dis 17.5¢
Blank Cartridges, 32 cal.	dis 35.00
Primed Shells and Bullets	dis 15¢
B. B. Caps, Round Ball	dis 17.5¢
B. B. Caps, Conical Ball, Swaged	dis 20.00
Primers	
Berger Primers all sizes, and B. L. Caps (for Sturtevant Shells)	dis 1.00
All other Primers, all sizes	dis 1.20
Small extras given by some dealers.	
First quality, 4, 8, 10 and 12 gauge, dis 25¢	
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30¢
Star, Club, Rival and 10 gauge, 30 list	dis 35¢
Club, Rival and 12 gauge, 30 list	dis 35¢
Club, Rival and 14, 16 and 20 gauge	dis 30¢
Seibold's Combination Shot Shells	dis 15¢
Brass Shot Shells, 1st quality	dis 10¢
Brass Shot Shells, Club, Rival, Climax	dis 65¢
A. R. & C. Co., 1, X, L, 10 & 12 gauge, dis 40¢	
A. R. & C. Co., "Special," 14 gauge, dis 30¢	
A. R. & C. Co., "Special," 10 & 12 gauge, dis 40¢	
Fowler's Patent, 10 & 12 gauge, 100	dis 35.75

Shells Loaded.

*List No. 19, 1887.....		dis 20 & 10¢
Wads—		
U. M. C. & W. R. A.—B. E., 11 up.....	\$2.00	
U. M. C. & W. R. A.—B. E., 9 & 10.....	2.30	
U. M. C. & W. R. A.—B. E., 7 & 8.....	2.50	D= 20¢ & 10¢
U. M. C. & W. R. A.—B. E., 11 up.....	3.10	With small
U. M. C. & W. R. A.—B. E., 9 & 10.....	4.00	extras.
U. M. C. & W. R. A.—B. E., 7 & 8.....	4.90	
U. M. C. & W. R. A.—B. E., 11 up.....		\$1.75
Henry's B. E., 11 up.....		\$3.50
U. M. C. & W. R. A.—B. E., 11 up.....		\$1.30
Anvils.—Eagle Anvils..... V D 10s, dis 90 & 20¢ & 10¢		
Peter Wright's.....		\$1.50
Armstrong's Horse Hole.....		25¢
Armstrong Mouse Hole, Extra.....	11¢	(\$11¢)
Trenson.....		9¢
W. H. Miller Co., Patent Sould.....		11¢
Amos Pipe and Dr—		
Millers Falls Co.....	\$1.00,	dis 30 & 10¢
Cheney Anvil and Vise.....		dis 35¢
Allen Combined Anvil and Vise.....	\$5,	dis 40 & 10¢
Moore & Barnes Mfg. Co.....		dis 33¢ & 10¢
Apple Parers.		

Wrought (Steel)—	
Fast Joint, Narrow	dis 70&10
Fast Joint, L. Narrow	dis 70&10
Fast Joint, Broad	dis 70&10
Loose Joint, Broad	dis 70&10
Table Bolt, Back Flange, &c.	dis 70&10
Inside Blind, Regular	dis 70&10
Inside Blind, Light	dis 70&10
Loose Pin	dis 70&10
Bronzed Wrought Bolts	dis 40&10 @ 40&10&5

Calipers—See Compasses.

Calks, Tee	
Gautier	dis 54&6
Dewicks	dis 54&6
Can Openers.	
Messenger's Comet	dis 35.00, dis 35
American	dis 35.00, dis 35
Duplex	dis 35.00, dis 35
Lyman's	dis 35.00, dis 35
No. 4, French	dis 35.00, dis 35
No. 5, Iron handle	dis 35.00, dis 35
Eureka	dis 35.00, dis 35
Sardine Slicers	dis 35.00, dis 35
Star	dis 35.00, dis 35
Springer, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 35.00, dis 35
World's Best, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 35.00, dis 35
Universal	dis 35.00, dis 35
Domestic	dis 35.00, dis 35
Champion	dis 35.00, dis 35

Cards.	
Horse and Curry	dis 10&10 @ 10&10&10
Cotton	dis 10&10 @ 10&10&10
Wool	dis 10&10 @ 10&10&10

Carpet Stretchers.	
Cast Iron, Polished	dis 35.00, dis 35
Cast Iron, Steel Points	dis 35.00, dis 35
Socket	dis 35.00, dis 35
Ballard's	dis 35.00, dis 35

Carpet Sweepers.	
Bliss No. 5, New Drop Pan	dis 35.00, dis 35
Bliss Grand	dis 35.00, dis 35
Grand Rapids	dis 35.00, dis 35
Crown Jewel	dis 35.00, dis 35
Magic	dis 35.00, dis 35
Jewel	dis 35.00, dis 35
Improved Parlor Queen, Nickel Trimmed	dis 35.00, dis 35

Improved Parlor Queen, Japanned Trimming.	
Excelsior	dis 35.00, dis 35
Garland	dis 35.00, dis 35
Parlor Queen	dis 35.00, dis 35
Housewife's Delight	dis 35.00, dis 35
Queen	dis 35.00, dis 35
Queen, with band	dis 35.00, dis 35
King	dis 35.00, dis 35
Weed Improved	dis 35.00, dis 35
Hub	dis 35.00, dis 35
Cog Wheel	dis 35.00, dis 35

Cartridges—See Ammunition.	
Casters.	
Bed	dis 35.00, dis 35
Flat	dis 35.00, dis 35
Shallow Socket	dis 35.00, dis 35
Deep Socket	dis 35.00, dis 35
Yale Casters, list May, 1884	dis 35.00, dis 35
Yale, Gem	dis 35.00, dis 35
Martin's Patent (Phoenix)	dis 35.00, dis 35
Payson's Anti-friction	dis 35.00, dis 35
Giant's "Truck" Casters	dis 35.00, dis 35
Stationary Truck Casters	dis 35.00, dis 35

Cattle Leaders.	
Hudson, Beckley & Co.'s	dis 70
Sargent's	dis 70
Kochlin's	dis 70
Peck, Stow & W. Co.	dis 70
Chains.	
Trace, 6-10-2, exact sizes, pair, \$1.00	dis 50&10
Trace, 6-10-3, exact sizes, pair, \$1.00	dis 50&10
Trace, 7-10-4, exact sizes, pair, \$1.11	dis 50&10
NOTE—Traces, "Regular" sizes 36 net & pair less than exact.	
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884	
American Coil, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 50&10
In oak lots, 8.75 6.25 5.00 4.50 4.00 3.50 3.00 2.50 2.00 1.50 1.00 .75 .50 .25	dis 50&10
Less than oak lots, add 10% per lb.	dis 50&10
German Coil, list of June 30, 1887	dis 50&10
Ger. Halter Chain, list of June 30, 1887	dis 50&10

Covert Halter, Hitching and Breast.	
Covert Halter	dis 50&10
Covert Hitching	dis 50&10
Covert Breast	dis 50&10
Onions Halter Chain.	
Onions Halter Chain	dis 50&10
Galvanized Pump Chain.	
Galvanized Pump Chain	dis 50&10
Jack Chain, Iron.	
Jack Chain, Iron	dis 50&10
Jack Chain, Brass.	
Jack Chain, Brass	dis 50&10
Chain, White.	
Chain, White	dis 50&10
Red.	
Red	dis 50&10
Blue.	
Blue	dis 50&10
White Cranes.	
White Cranes	dis 50&10
Chain Lines—See Lines.	

Socket Framing and Firmer—	
P. S. & W.	dis 75&5
New Haven and Middlesex	dis 75&10
Ohio Tool Co.	dis 75&10
Buck Bros.	dis 75&10
Merrill	dis 75&10
L. & J. White	dis 75&10
Witherby and Douglass	dis 75&10
Tanged Firmers	dis 75&10
Tanged Firmers, Butcher's	dis 75&10
Tanged Firmers, Spear & Jackson's	dis 75&10
Tanged Firmers, Buck Bros.	dis 75&10
Cold Chisels	dis 75&10
Chucks.	
Beach Patent	dis 75&10
Morse's Adjustable	dis 75&10
Danbury	dis 75&10
Syracuse, Rais Pat.	dis 75&10
Clamps.	
Providence Tool Co.'s Wrought Iron	dis 75&10
Adjustable, Gray	dis 75&10
Adjustable, Lambert's	dis 75&10
Adjustable, Snow's	dis 75&10
Adjustable, Hammer's	dis 75&10
Adjustable, Stearns	dis 75&10
Stearns' Adjustable Cal. and Corner	dis 75&10
Cabinet, Sargent's	dis 75&10
Carriage Makers', Sargent's	dis 75&10
Eberhard Mfg. Co.	dis 75&10
Warner's	dis 75&10
Saw Clamps—See Vices.	
Clips.	
Clips, Axle, 1/4 & 5-16	dis 75&10
Second grade Norway Axle, 1/4 & 5-16	dis 75&10
Superior Axle Clips	dis 75&10
Norway Spring Bar Clips, 5-16	dis 75&10
Wrought Iron Felloe Clips	dis 75&10
Steel Felloe Clips	dis 75&10
Baker Axle Clips	dis 75&10
Groceries	dis 75&10
Cocks, Brass—Sawdust list.	
Coffee Mills	dis 75&10
Box and Side, list revised Jan. 1, 1888	dis 75&10
American Enterprise Mfg. Co.	dis 75&10
The "Swift," Lane Bros	dis 75&10

Compasses, Dividers, &c.	
Compasses, Callipers, Dividers	dis 70&10
Semis & Call Co.'s Dividers	dis 70&10
Semis & Call Co.'s Compasses & Callipers	dis 70&10
Semis & Call Co.'s Wing & Inside or Outside	dis 70&10
Semis & Call Co.'s Double	dis 70&10
Semis & Call Co.'s (Call's Patent Inside)	dis 70&10
Stevens & Co.'s Callipers and Dividers	dis 70&10
Starrett's Spring Callipers and Dividers	dis 70&10
Starrett's Lock Callipers and Dividers	dis 70&10
Starrett's Combination Dividers	dis 70&10

Bradley's	
Bradley's	dis 70&10
Libertson Mfg. Co.	dis 70&10
Realty's	dis 70&10
Industry Tool Co.	dis 70&10
Johnson & Beckley Mfg. Co.	dis 70&10
Johnson's Patent	dis 70&10
Johnson & Hubert	dis 70&10
Uran Knives and Cutters.	
Bradley's	dis 70&10
Bradley's	dis 70&10
Bradley's	dis 70&10
Bradley's	dis 70&10
Bradley's	dis 70&10
Bradley's	dis 70&10
Bradley's	dis 70&10
Bradley's	dis 70&10
Bradley's	dis 70&10
Bradley's	dis 70&10

Curry Combs.	
Curry Combs	dis 70&10
Rubber	dis 70&10
Perfect	dis 70&10
Curtain Pins—Silvered Glass.	
Curtain Pins	dis 70&10
Wetor Enamel	dis 70&10
Beaver Falls and Booth's	dis 70&10
Wostenholme	dis 70&10

Dampers, &c.	
Dampers, Buffalo	dis 70&10
Butter Damper Clips	dis 70&10
Crown Damper	dis 70&10
Excelsior	dis 70&10

Dividers—See Compasses.	
Oeg Cellars.	
Embossed Gift, Pope & Stevens' list	dis 70&10
Leather, Pope & Stevens' list	dis 70&10
Brass, Pope & Stevens' list	dis 70&10
Doors, &c.	
Torrey's Rod, regular size	dis 70&10
Gray's	dis 70&10
Warner's No. 1	dis 70&10
Beck Rod	dis 70&10
Gem (Coll), list April 15, 1884	dis 70&10
Star (Coll), list April 15, 1884	dis 70&10
Victor (Coll)	dis 70&10
Champion (Coll)	dis 70&10
Philadelphia	dis 70&10
Cowell's	dis 70&10
Rubber, complete	dis 70&10
Hercules	dis 70&10
Shaw, Dox & Co.	dis 70&10
Elkitt's Door Check and Spring	dis 70&10

Drawing Knives.	
P. S. & W.	dis 75&5
Mix.	dis 75&10
New Haven and Middlesex	dis 75&10
Merrill	dis 75&10
Witherby and Douglass	dis 75&10
Worthington	dis 75&10
L. & J. White	dis 75&10
Bradley's	dis 75&10
Adjustable Handle	dis 75&10
Wilkinson's Folding	dis 75&10

Drills and Drill Stocks.	
Blacksmith's Self-Feeding	dis 75&10
Breast, P. S. & W.	dis 75&10
Breast, Wilson's	dis 75&10
Breast, Millers Falls	dis 75&10
Breast, Bartholomew's	dis 75&10
Breast, Merrill's	dis 75&10
Breast, Ingersoll's	dis 75&10
Breast, Brodie's	dis 75&10
Breast, Whitney's	dis 75&10
Breast, Weston's	dis 75&10
Breast, Moore's Triple Action	dis 75&10
Whitney's Hand Drill, Plain, \$11.00, Adjustable	dis 75&10
Wilson's Drill Stock	dis 75&10
Automatic Boring Tools	dis 75&10
Twist Drills	dis 75&10

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Twist Drills	dis 75&10

10 eggs, 7 D.....	4	5	24
10 eggs, 7 D.....	4	5	24
10 eggs, 7 D.....	4	5	3
10 D cans, 10 in case	6	6	5
10 D cans, less than 10	10	10	7

Enamelled and Tinned Ware.—See Hollow Ware.

Eucalyptus Pins.

Iron, 1st Nov. 11, 1885.....	dis 50&10 @ 50&10&5
Brass.....	dis 50 @ 50&5

Hickory Firmer Chisel, assorted..... \$ gross 4.50
Firmer Chisel, large..... \$ gross 5.00
Apple Firmer Chisel, assorted..... \$ gross 4.00
Apple Firmer Chisel, large..... \$ gross 5.00
Socket Firmer Chisel, assorted..... \$ gross 3.00
Socket Framing Chisel, assorted..... \$ gross 6.00
J. B. Smith Co.'s Pat. File..... \$ dis 50
File, assorted..... \$ gross 2.75 \$ dis 40
Auger, assorted..... \$ gross 5.00 40&10
Auger, large..... \$ gross 7.00
Patent Auger, Ives..... \$ dis 30&10
Patent Auger, Douglass..... \$ set \$1.25 net
Patent Auger, Swan's..... \$ set \$1.00 net
Hoe, Rake, Shovel, &c..... \$ dis 50&10
Crescent Cut Saw Handles—
No. 1 Loop, \$ pair 30¢ No. 2, 22¢ No. 3
and No. 4, Reverse..... \$ 25
Boynton's Loop Saw Handles..... 50¢, dis 60
Champion..... 15¢

Hangers.
Barn Door, old patterns..... \$ dis 60&10&10 70
Barn Door, New England..... \$ dis 60&10&10 70
Samson Steel Anti-Friction..... \$ dis 5¢
Orleans Steel..... \$ dis 5¢
Hamilton Wrought Wood Track..... \$ dis 5¢
R. & Wood Track..... \$ dis 5¢
Champion..... \$ dis 5¢
Rider and Wooster, Medina Mfg. Co.'s Pat..... \$ dis 7
Climax Anti-Friction..... \$ dis 5¢
Climax Steel Anti-Friction..... \$ dis 5¢
Zenith for Wood Track..... \$ dis 5¢
Steel Steel Arm..... \$ dis 5¢
Challenge Steel Arm..... \$ dis 5¢
Sterling Improved (Anti-Friction)..... \$ dis 5¢
Victor, No. 1, \$15; No. 2, \$16.50; No. 3, \$18..... \$ dis 4¢
Charlize..... \$ dis 5¢
Kiddie..... \$ dis 40&10 60
The "Boss"..... \$ dis 40
Steel Anti-Friction..... \$ dis 60
Dodge & Co. (Track)..... \$ dis 60
Terry's Patent..... \$ dis 60
Rider..... \$ dis 60
Cronk's Patent..... No. 4, \$13; No. 5, \$14.40; No. 6, \$15
Wood Track Iron Clad..... \$ ft. 10¢, dis 50&15 60
Carrier Steel Anti-Friction..... \$ dis 60 50&5
Carrots..... \$ set 30.00, dis 30
Rollers..... \$ set 30.00, dis 30
Felix..... \$ set 30.00, dis 30
Richards..... \$ dis 30 50&10
Lane's Steel Anti-Friction..... \$ dis 40&10
The Ball Bearing Door Hanger..... \$ dis 20&10 25&10
Warner's Patent..... \$ dis 20 20&10
Steel Anti-Friction..... \$ dis 20 20&10
Stearns Challenge..... \$ dis 25&10 10&5
Faultless..... \$ dis 40 40&10
American..... \$ set 30; dis 20&10
Rider & Wooster, No. 1, 62½¢; No. 2, 75¢..... \$ dis 40
Paragon, No. 1, 2 and 3..... \$ dis 40&10
Paragon, Nos. 5, 5½, 7 and 8..... \$ dis 40&10
Crescent..... \$ dis 60 60&10
Nickel Cast Iron and Steel..... \$ dis 50
Nickel, Malleable Iron and Steel..... \$ dis 50
Scranton Anti-Friction Single Strap..... \$ dis 35
Scranton Anti-Friction Double Strap..... \$ dis 40
Universal Anti-Friction..... \$ dis 40
Wild West, 4 in. wheel, \$15; 5 in. wheel, \$21..... \$ dis 45
Star..... \$ dis 4 10 40&10&5
M..... \$ dis 50&5 10&10

Harness Snaps.—See Snaps.

Hatchets.—List Jan. 1, 1885.
Isaiah Blood..... \$ dis 25 40&5
Hunt's Shingling Lath and Claw..... \$ dis 40&5
Hunt's Broad..... \$ dis 40
Buffalo Hammer Co..... \$ dis 40&10 50
Hard's..... \$ dis 40&10 40
Wm. Mann, Jr., & Co..... \$ dis 40&10 50
Underhill Edge Tool Co..... \$ dis 40&5 40&10
Underhill's Haines and Bright goods..... \$ dis 35
C. Hammond & Son..... \$ dis 40&10 60
Simmons..... \$ dis 40&10 50
Felt's..... \$ dis 40&10 40&10
Barnett & Co..... \$ dis 50 50&5
Ten Eyck Edge Tool Co..... \$ dis 40&10 40&10
Collins, following list..... \$ dis 10
Shingling, Nos. 1, 2, 3..... \$ dis 35.50 36.00 36.50
Claw, Nos. 1, 2, 3..... \$ dis 6.00 6.50 7.00
Lathing, Nos. 1, 2, 3..... \$ dis 6.50 6.00 6.50

Hay Knives.
Lightning..... Mfrs. price \$ dis \$18, dis 25
Jobber's Extras..... \$ dis \$17, dis 30
Wadsworth's..... \$ dis \$18, dis 30
Carter's Needle..... \$ dis \$11.50 12.00
Heath's..... \$ dis \$12.50 13.00

Hinges.
Wrought Iron Hinges—
Strap and T..... \$ dis 70&10&5 70&10&10
Screw Hook and..... \$ 12 to 18 in. \$ 34¢
Strap..... \$ 12 to 30 in. \$ 34¢
Heavy Welded Hook..... \$ 14 to 30 in. \$ 34¢
Screw Hook and Eye..... \$ 14 in. \$ 34¢
Rolled Blind Hinges, Nos. 33 and 34..... \$ dis 50&10
Rolled Blind Hinges, Nos. 33 and 34..... \$ dis 50&10
Rolled Plate..... \$ dis 70&5
Rolled Raised..... \$ dis 70&10
Plate Hinges 3, 10 & 12 in. \$ 5
"Providence" over 12 in. \$ 5

Ring Hinges.
Steel Spring and Blank Butts..... \$ dis 40
Union Hinges Co.'s Pat. March, 1885..... \$ dis 30
Acme and U. S..... \$ dis 30
Empire and Crown..... \$ dis 30
Hero and Monarch..... \$ dis 50
American, Gem, and Star, Japanned..... \$ dis 30
American, Gem, and Star, Bronzed..... \$ dis 30
Oxford, Bronze and Brass..... \$ dis 30
Union Mfg. Co..... \$ dis 30
Bommer's..... \$ dis 30
Buckman's..... \$ dis 15 30
Chicago..... \$ dis 30

Sole Hinges.
Western..... \$ dis \$4.40, dis 55
H. B. Remondable..... \$ dis \$7.00, dis 55
H. B. Remondable..... \$ dis \$6.50, dis 55
Clark's, Nos. 1 & 2..... \$ dis 40&10
N. Y. State..... \$ dis \$5.00, dis 55
Automatic..... \$ dis \$12.50, dis 50
Common Sense..... \$ dis pair \$4.50, dis 50
Beymour's..... \$ dis 45&10
Red's Lath and Hinges..... \$ dis 40&10
Blind Hinges—
Parker..... \$ dis 75&25
Palmer..... \$ dis 50&25
Beymour..... \$ dis 70&25
Nicholson..... \$ dis 45&10
Clark's, Nos. 1, 2, 5, 40 and 50..... \$ dis 75&10&10
Clark's Mortise Gravity..... \$ dis 75&10
Sargent's, Nos. 1, 5, 11, 13..... \$ dis 75&10&10
Sargent's, No. 15..... \$ dis 75&10
Reading's Gravity..... \$ dis 75&10 75&10&5

Shepard's Noiseless Niagara, Buffalo, Champion,
Steamboat, Clark's Old Pattern and Clark's Tip
Pattern..... \$ dis 75&10&5
Shepard's O. S. Lull & Porter..... \$ dis 75&10
Shepard's Acme Lull & Porter..... \$ dis 75&10
Shepard's Queen City Reversible..... \$ dis 75
Clark's Lull & Porter, Nos. 9, 1, 1½, 2, 3..... \$ dis 75&10&10
North's Automatic Blind Frixure, No. 2, for
Wood, \$10.50; No. 3, for Bricks, \$13.50..... \$ dis 55&25

Blades.
Garden, Mortar, &c..... \$ dis 55&5
Planters, Cotton, &c..... \$ dis 55&5
Warren Hoe..... \$ dis 60
Magio..... \$ dis \$4.75

Scissors & H. Scovill.
Lane's Crescent Scovill Pattern..... \$ dis 20
Lane's Crescent Planters Pattern..... \$ dis 25
Lane's Razor Blade, Scovill Pattern..... \$ dis 30
Maynard, S. & O. Pat..... \$ dis 45&5
Sandusky Tool Co..... \$ dis 60
Hubbard & Co..... \$ dis 60
Geo..... \$ dis 60 60&10

Hog Rings and Ringers.
Hill Improved Ringers..... \$ dis \$4.50
Hill's Old Style Ringers..... \$ dis \$3.00
Hill's Tongues..... \$ dis \$2.50
Hill's Rings..... \$ dis boxes \$2.25 3.40
Perfect Rings..... \$ dis boxes \$1.75 2.00
Perfect Ringers..... \$ dis \$2.50
Hill's Hog Ringers..... \$ dis \$2.50 3.25
Champion Ringers..... \$ dis \$2.50 1.00
Champion Ringers, Double..... \$ dis \$2.00
Brown's Ringers..... \$ dis \$2.00
Brown's Rings..... \$ dis \$1.25 1.30

Hoisting Apparatus.
"Moore's" Hand Hoist, with Lock Brake..... \$ dis 70
"Moore's" Differential Pulley Block..... \$ dis 40
Helders, File and Teel..... \$ dis 25
Nicholson, File Holders..... \$ dis 25
Hollow-Ware.

Hollow-Ware.
Stove Hollow-Ware, Ground..... \$ dis 60&10 60&10&5
Stove Hollow-Ware, Underground..... \$ dis 70 70&5
Enameled and Tinned Hollow-Ware—
Kettles..... \$ dis 70 70&5
Oval Boilers, Saucepans & Stew Pots..... \$ dis 40&5 40&10
Gray Enameled Ware..... \$ dis 50&10 50&10
Asate and Granite Ware..... \$ dis 25
Rustless Hollow-Ware..... \$ dis 50 50&5
Galvanized Tea-Kettles—
Inch..... 6
2 6
3 6
4 6
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7 6
8 6
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11 6
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per Lake, C. Quality White (only).....	37¢ @ 25¢
Ivan Spring, Extra Braided, White.....	34¢
Ivan Spring, Extra Braided, Drab.....	30¢
Imper Idem, Braided, White.....	30¢
ryptian, India Hemp, Braided.....	50¢ dia 30 @ 30¢ 5
ymson, Braided, White Cotton.....	55¢ dia 30 @ 30¢ 5
ymson, Braided, Drab Cotton.....	55¢ dia 30 @ 30¢ 5
ymson, Braided Italian Hemp.....	55¢ dia 30 @ 30¢ 5
ymson Braided Linen.....	50¢ dia 30 @ 30¢ 5
Sash Locks.	
Clark's No. 1, \$10.00; No. 2, \$3.00 ♀ gross.....	dis 23¢ 5
Corrison's.....	dis 22¢ 5
Corrison and Trump, list Aug. 16, 1886.....	dis 60¢ 5
ector.....	60¢ 10¢ 5
alkers.....	dis 10 ¢
etwell Mfg. Co.....	dis 30¢ 5
iamond's Window Springs.....	dis 40 ¢
Common Sense, Jap d. Cop'd and Br'ed.....	♀ gross \$1.00
Universal.....	dis 30 ¢
emphall's Gravity.....	dis 60 ¢
emphall's Model.....	dis 60¢ 00 ¢ 5
February 15, 1886.....	dis 70 ¢
arson's Perfect.....	dis 60 @ 60¢ 10
uganin's new and Improved Adjustable Sash Lock.....	dis 35¢ 2 5
ance, list Jan. 5, 1887.....	dis 35¢ 2 5
uganin's New Sash Locks, list Jan. 5, '87.....	dis 35¢ 2 5
oddard "Practical".....	dis 12 ¢
Peters.....	dis 30 ¢
Not 100 & 110; ♀ gro. 5¢ 105 ¢ 10 ¢ 5	dis 30¢ 10
avis, Frouze, Barnes Mfg. Co.....	dis 40 ¢
ampton Safety, list March 1, 1884.....	dis 55¢ 5¢ 5
ecurity.....	dis 70 ¢
Sash Weights.	
old Eyes.....	♀ gum 25
Sausage Stuffers or Millers.	
lles "Challenge".....	♀ dos. 30¢, dis 50¢ 00¢ 5
erry.....	♀ dos. No. 1, \$15; No. 2, \$25, dis 50¢ 50¢ 5
erry Cut No. 4.....	cash, 50¢ 00, dis 30 ¢
nterprise Mfg Co.....	dis 50¢ 10 @ 30 ¢
.....	dis 40¢ 5
Saws.	
iston's Circular.....	dis 45¢ 50 ¢
iston's Cross Cuts, dis 45¢ 45 ¢ 5	Extr. some - times given by jobbers.
iston's Hand.....	dis 25 @ 35¢ 5
ttkins' Circular.....	dis 50 ¢
ttkins' Silver Steel Diamond X Cuts.....	♀ foot 70¢
ttkins' Special Steel Dexter X Cuts.....	♀ foot 50¢
ttkins' Special Steel Diamond X Cuts.....	♀ foot 50¢
ttkins' Champion and Electric Tools & Cuts.....	♀ foot 27 @ 25¢
ttkins' Hollow Buck X Cuts.....	♀ foot 15¢
ttkins' Shingle, Mulay, Drag, &c.....	dis 45 ¢
W. M. & C. Hand.....	dis 30¢ 5 @ 30¢ 10
W. M. & C. Champion X Cuts, Regular ♀ foot.....	34¢ 00¢ 5
W. M. & C. X Cuts, Thin Back.....	dis 45¢ 10 ¢
Peace Hand Panel and Rip.....	dis 30¢ 10 @ 30¢ 10¢ 10
Peace Cross Cuts, Standard.....	♀ foot 25¢
Peace Cross Cuts, Thin Back.....	♀ foot 27¢ 00¢ 5
Richardson's Circular and Mill.....	dis 45 @ 45¢ 10
Richardson's X-Cuts, No. 1, 90¢; No. 2, 27¢; No. 3, 24¢	
Saw Saws.	
Griffin's Hack Saws, complete.....	dis 40¢ 10 @ 50 ¢
Griffin's Hack Saw, Blades only.....	dis 40¢ 10 @ 50 ¢
Star Hack Saws and Blades.....	dis 25 ¢
Diamond Hack Saws and Blades.....	dis 25 ¢
Eureka and Crescent.....	dis 25 ¢
Saw Frames.....	♀ gro 80 @ \$10
White Vermont.....	dis \$1.50, dis 35 ¢
White Polished and Varished.....	♀ dos \$1.50, dis 35 ¢
Saw Sets.	
Stillman's Genuine.....	♀ dos \$5.00 and \$7.75, dis 40¢ 25
Stillman's Imita.....	♀ dos \$2.35 and \$3.35, dis 40¢ 10¢
Common Law.....	♀ dos \$3.00, dis 40¢ 25
Corrison's No. 1, \$15.00; No. 2, & 4, \$10.00; No. 3, \$7.50.....	dis 15 @ 20 ¢
Leach's.....	No. 6, \$3.00; No. 7, \$15.00, dis 15 @ 20 ¢
Hammer, Hotchkiss.....	dis 30¢ 10 @ 30¢ 10¢ 10
Hammer, Bemis & Call Co.'s new Patent.....	dis 30¢ 5
Bemis & Call Co.'s Lever and Spring Hammer.....	dis 30¢ 5
Bemis & Call Co.'s Plate.....	dis 10 ¢
Bemis & Call Co.'s Cross Cut.....	dis 50¢ 10
Alkon's Imitation.....	dis 70 ¢, dis 30¢ 5
Hart's Patent Lever.....	dis 30 ¢
Diaton's Star, No. 15, \$5.50, dis 30¢ 10 @ 30¢ 10¢ 10	
Atkins' Lever.....	per dos No. 1, \$5.00; No. 2, \$6.00
Atkins' Criterion.....	per dos \$7.50
Croissant & Keller, No. 1, \$15.00; No. 2, \$25.00.....	dis 40¢ 10
Atkins Perfection.....	\$15.00; Excelsior \$5.00 ♀ dos
Scales.	
Hatch, Counter, No. 171, good quality.....	♀ dos \$21
Hatch, Tea, No. 161.....	♀ dos \$5.75 @ \$7.00
Union Platform, Plain.....	\$2.00 @ \$2.50
Union Platform, Ornate.....	\$2.50 @ 2.50
Union Platform, Ornate Trip Scales.....	dis 50 ¢
Chatillon's Favorite.....	dis 50 ¢
Chatillon's Europa.....	dis 40 ¢
Family Turnbull.....	dis 30¢ 5
Riehle Bros.' Platform.....	dis 5 ¢
Scale Scales.	
Scale and List of Jan. 15, '82.....	dis 50¢ 10 @ 50¢ 10¢ 10
Chatillon's No. 1.....	dis 40 ¢
Chatillon's No. 2.....	dis 50 ¢
Screws.	
Adjustable Box Screws (R. E. & L. Co.).....	\$5.50, dis 30¢ 10
Box, 1 Handle.....	♀ dos \$4.00, dis 10 ¢
Box, 2 Handle.....	♀ dos \$5.00, dis 10 ¢
Defiance Box and Ship.....	dis 30¢ 10
Ship, Common.....	dis 30¢ 10
Ship, Common.....	♀ dos \$5.50 and \$6.00
Ship, Common.....	dis 10 ¢
Screws Window and Door Frames.	
Porter's Pat. Window and Door Frame.....	dis 25¢ 40¢ 10
Screen Corner Irons, Warner's.....	dis 35 ¢
Stearns' Pat. Window and Door Corners.....	dis 25 @ 35¢ 10
Screw Drivers.	
Douglas Mfg Co.....	dis 30¢ 10¢ 10
Douglas S.....	dis 45¢ 10 ¢
Diaton's Patent Excelsior.....	dis 45¢ 10 ¢
Buck Bros.....	dis 30 ¢
Stanley & L. Co.'s Varnished Handles.....	dis 50¢ 10
Stanley & L. Co.'s Black Handles.....	dis 50¢ 10
Sargent & Co.'s No. 1 Forged Handle.....	dis 60 @ 10¢ 10
Sargent & Co.'s No. 30 & 60.....	dis 60¢ 5 @ 10¢ 10
Knapp & Cowles' No. 1.....	dis 60¢ 5 @ 70 ¢
Knapp & Cowles' No. 1 Extra.....	dis 60 @ 60¢ 10
Knapp & Cowles' No. 00 & 2.....	dis 50¢ 5 @ 10¢ 10
Stearns.....	dis 25¢ 10¢ 5
Stearns' Patent.....	dis 35 ¢
Champion.....	dis 35¢ 10 ¢
Clark's Patent.....	dis 30 @ 33¢ 4
Crawford's Adjustable.....	dis 30 ¢
Elrich's Socket and Ratchet.....	dis 25 @ 35¢ 10
Allard's Spiral, new Pat.....	♀ dos 30 ¢, dis 35¢ 10
Kelb's Concrete Screw-Drive Bits.....	dis 30 @ 30¢ 5
Screw Driver Bits.....	♀ dos 50¢ @ 75¢
Screw Driver Bits, Parr's.....	♀ gro 6 ¢
Fray's Hol. Hdle. Sets, No. 3, \$12.....	dis. 35 @ 25 @ 10 ¢
P. D. & Co.'s, all Steel.....	dis 50 ¢
Screws	
Wood Screws-List, Brass, Jan 27; Iron, July 1, 1887	
Flat Head Iron.....	dis 70 ¢
Round Head Iron.....	dis 65 ¢
Flat Head Brass.....	dis 65 ¢
Round Head Brass.....	dis 60 ¢
Flat Head Bronze.....	dis 65 ¢
Round Head Bronze.....	dis 60 ¢
Ex. 10 ¢ often given by jobbers.	

Shears.
Flat Head, Iron.....dis 55 10
Round Head, Iron.....dis 50 25
Bench and Band—
Bench, Iron.....dis 55 & 10 @ 55 & 10 & 10 10
Bench, Wood, Bench.....dis 32 25
Bench, Wood, Hickory.....dis 30 & 10
Lar, Blunt Point.....dis 75
Cosan and Lag, Gizalet Point.....dis 75 4
Bed.....dis 52 & 5
Band Rail, Sargent's.....dis 60 & 10
Band Rail, Humason, Beckley & Co.'s.....dis 70 & 10 @ 75
Band Rail, Am. Screw Co.....dis 75 4
Band Rail, Miller Falls Mst.....dis 50 @ 50 & 10
Jack Screws, P. S. & W.....dis 35
Jack Screws, Sargent.....dis 60 & 10 @ 60 & 10 & 5
Jack Screws, Stevens.....dis 40 @ 40 & 10
Screw Saw.
Lester, complete, \$10.00.....dis 25 4
Rovers complete \$4.00.....dis 25 4
Barnes' Builders' and Cabinet Makers', \$15.....dis 25 4
Soythe Sheaths.....dis 50 & 2
Shears.
American (Cast) Iron.....dis 75 & 10 @ 75 & 10 & 5
Pruning.....See Pruning Hooks and Shears
Barnard's List Pruners.....dis 32 75
Dunlop, Pruning.....dis 30 & 10
Seymour's, Lat. Dec. 1881, dis 60 & 10 & 10 @ 60 & 10 & 10 & 5
Heinrich's, Lat. Dec. 1881, dis 60 & 10 & 10 @ 60 & 10 & 10 & 5
Heinrich's Tailor's Shears.....dis 34 4
First quality C. S. Trimmers.....dis 80 @ 80 & 10
Second quality C. S. Trimmers.....dis 80 & 10 @ 80 & 10 & 10
Diamond Cast Shears.....dis 10 & 10
Clipper.....dis 10 & 10
Victor Cast Shears.....dis 75 & 10 @ 75 & 10 & 5
Howe Bros. & Hulbert, Solid Forged Steel.....dis 40 4
Cleveland Machine Co., Solid Steel Forged.....dis 70 4
Clausen Shear Co., Japanned.....dis 70 4
Clausen Shear Co., Nickeled, same list.....dis 60 4
Shovels.
Shovel, Dec.
W. & C. Co., list July, 1888.....dis 50 & 10 @ 50 & 10 4
R. & E., list Dec. 18, 1888.....dis 50 & 10
Corbin's list.....dis 60 & 10 & 2 4
Patent Roller.....dis 60 & 10 & 2
Patent Roller, Hatfield's.....dis 75 4
Russell's Anti-Friction, list Dec. 18, 1888.....dis 60 & 2
Anti-Friction.....dis 60 4
Sliding Sawter.
R. & E. list Dec. 18, 1888.....dis 60 & 10 & 2
Sargent's list.....dis 60 & 10
Reading list.....dis 60 & 10 & 10
Ship Tools.
L. & J. L. White.....dis 30 & 5
Albertson Mfg. Co.....dis 25 4
Shoes, Horse, Mule, &c.
Horse—
Burden's, Perkins', Phoenix, at factory.....\$4.00
Add \$1 4 per to above prices.
Ox, Wrought—
Ton lots.....dis 94
1000 lb lots.....dis 94
500 lb lots.....dis 100
Whet *Passer*, prices, 25 off. cash, 5 days.....\$1.25
Drop, 4 bag, 25.....\$1.25
Drop, 4 bag, 25.....\$1.25
Back and Chilled, 4 bag.....\$1.00
Stuck and Chilled, 4 bag.....\$1.37
Shovels and Spades.
Ames' Shovels, Spades, &c., list Nov. 1, 1888.....dis 80 4
NORX.—Jobbers frequently give 5 @ 7 1/2 % extra on above.
Guth's Black Iron.....dis 50 & 10
Guth's Gold's Solid Cast Steel R. R. Goods.....dis 60 @ 60 & 10
Old Colony (Sanford Fork & Tool Co.).....dis 20 4
St. Louis Shovel Co.....dis 20 @ 20 & 7 1/2
Hussey, Bliss & Co.....dis 15 @ 55 4
Hubbard & Co.....dis 20 @ 20 & 7 1/2
Lehigh Mfg. Co.....dis 50 & 10
Payson & Son, list January, 1889.....dis 80 4
Rowland's (Lowman's Patent), dis 30 & 10 @ 40
Rowland's, Black Iron.....dis 50 & 10
Rowland's Steel.....dis 60 & 5 @ 60 & 10
Shovels and Tongs.
Iron Head.....dis 60 & 10 @ 60 & 10 & 5
Brass Head.....dis 60 & 10 & 10
Skeins, Thimble.
Western list.....dis 75 & 5 @ 75 & 10
Columbian, list Nov. 1, 1887.....dis 30 4
Columbia Iron Co.....dis 50 & 10
Utica P. S. T. Skeins.....dis 60 4
Utica Turned and Fitted.....dis 35 4
Sieves.
Buffalo Metallic, S. S. & Co., new list.....dis 50 & 25 & 10 4
Barier Flour Sifters.....dis 30 4
Gold's Adjustable Milk Strainer.....dis 35 4
Smith's Adjustable Milk Strainer.....dis 35 4
Smith's Adjustable F. & C. Strainer.....dis 35 4
Staves, Wooden Rim—
Mesh 18, Nested, 4 doz.....70 4
Mesh 20, Nested, 4 doz.....85 4
Mesh 24, Nested, 4 doz.....\$1.00
Staves, Harvest, &c.....dis 60 & 10
Staples, Barbed, &c.
Anchor (T. & S. Mfg Co.).....dis 60 4
Fitch's (Bristol).....dis 60 & 10
Hutchins.....dis 10 4
Andrews.....dis 40 4
Sargent's Patent Guarded.....dis 70 & 10 & 10
Covers, new list.....dis 40 & 10
Covert.....dis 50 & 2
Covert, New Patent.....dis 50 & 2
Covert New R. E.....dis 60 & 2
Covered Spring.....dis 60 & 10 & 10
Soldering Irons.
Covert's Adjustable, list Jan. 1, 1889.....dis 35 & 2
Covert's Shaves, Iron.....dis 45 4
Wood.....dis 40 & 10
Bailey's (Stanley E. & L. Co.).....dis 40 & 10
Stearns.....dis 30 & 10 @ 30 4
Spoke Trimmers.
Sonney's.....dis 10.00, dis 50 4
Iverson's.....dis 50 & 10
Dugan's, No. 1, \$15.00; No. 2, \$12.00 4 doz.....dis 50 4
Dugan's.....dis 50 4
Spoons and Forks.
Tinned Iron—
Basting, Central Stamping Co.'s list.....dis 70 & 10
Solid Table and Tea, Central Stamping Company's.....dis 70 & 10
Buffalo, S. R. & Co.....dis 35 & 2 4
Mixer, Plated—1 mo. or 5 % cash 5 days.
Meriden Brit. Co., Rogers.....dis 50 4
C. Rogers & Bros.....dis 50 4
Rogers & Bro.....dis 50 4
Reed & Barton.....dis 50 & 10 @ 50 & 10 & 5
Almond, Hall, Miller & Co.....dis 50 & 10 @ 50 & 10 & 5
H. & E. Silver Co., Mexican Silver.....dis 50 & 5
H. & E. Silver Co., Durham Silver.....dis 50 & 5
German Silver.....dis 50 & 5 @ 50 & 5 4
Nickel Silver, Hall & Elton.....dis 50 & 5 4
Britannia.....dis 50 & 5 @ 50 & 10 & 5 4
Boardman's Flat Ware.....dis 50 & 10
Boardman's Nickel Silver.....dis 50 4
Boardman's Brit'nia Spoons, case lots.....dis 50 4

Springs.
Elliptic, Concord, Platform and Hair Scroll.....dis 60 @ 60±½
Chair's Bolster Springsdis 22 ½

Squares.
Steel and Iron..... } dis 75 @ 80 ±
Nickel-Plated..... }
Try Square and T Bevels.....dis 60±10±10 @ 70 ±
Diston's Try Square and T Bevels.....dis 45±10 ±
Interbottom's Try and Witer.....dis 80±10 ±
Statton's Micrometer Calliper Squares.....dis 25 ±

Staples.
Fence Staples, Galvanized } Same price as Barb Wire.
Fence Staples, Plain } See Trade Report.

Steelyards.dis 50±10±50 ±

Stocks and Dies.
Blanchard's Warford Goods.....dis 30±5 @ 80±10 ±
Lightning Screw Plate.....dis 25 @ 30 ±
Reece's New Screw Plates.....dis 33½ @ 33½±½

Stone.
Hindustan No. 1, 3½; Axe, 5½; Slips No. 1, 5½.....do 22
Sand Stone.....do 22
Wasita Stone, Extra.....do 1 @ 1±
Wasita Stone, No. 1.....do 15 @ 16 ±
Wasita Stone, No. 2.....do 11 @ 12 ±
Wasita Stone, No. 1, Extra.....do 40 @ 42 ±
Wasita Slips, No. 1.....do 30 @ 32 ±
Arkansas Stone, No. 1, 4 to 9 in.....do 17±
Arkansas Stone, No. 1, 6 to 9 in.....do 17±
Turkey Oil Stone.....do 4 to 9 in., do 40±
Turkey Slips.....do \$1.00 @ \$1.50
Lake Superior, Chase.....do 1, 16±
Wilmington Slips.....do 18 @ 18±
Seneca Stone, Red Paper Brand.....do 18 @ 18±
Seneca Stone, High Rounds, do 27±
Seneca Stone, Small White, gro. 82±.00
Steve Polish.—Joseph Dixon's.....gro 36, dis 10 ±
Gem.....gro \$4.50, dis 10 ±
Glorious Medal.....gro 80.00, dis 85 ±
Wilson's Wire.....gro 80.00, dis —
Lustrous.....gro 80.00, dis —
Ruby.....gro \$4.75 net
Rising Sun, 5 gro. lots.....gro 75±
Dixon's Plumbago.....do 5¢ net
Boynton's Noon Day.....gro.....\$5.00
Watson's Stove Enamel.....gro, \$18
Yates Liquid.....do 10 gal. cans
Wal.....\$0.90 80 70 10
Yates Standard Paste Polish 10-lb cans, per lb, 15 ¢
Jet Black.....gro \$3.50
Japanese.....gro \$3.50
Fireweld.....gro \$2.50
Winona O. K Enamel.....gro \$19.00
Bonnell's Liquid Tacks Polish.....gro \$4.00
Bonnell's Paste Stove Polish.....gro \$4.00
Black Eagle Benzine Paste, 5 and 10 lb. cans.....do 12±
Black Jack Water Paste, 5 and 10 lb. cans.....do 12±
Nickel Plate Paste, per gross.....do \$3.00

Tacks, Brads, &c.
List Jan. 2, 1888.
American Iron Carpet Tacks.....dis 80 @ 80±½
Steel Carpet Tacks.....dis 80 @ 80±½
Swedes Iron Carpet Tacks.....dis 80 @ 80±½
Swedes Iron Cut Tacks.....dis 75 @ 75±½
Swedes Iron Tacks.....dis 75±½ @ 75±10 ±
Swedes Iron Upholsterers' Tacks.....dis 75±10 @ 75±10±½
Tinned Swedes Iron Tacks.....dis 75±10 @ 75±10±½
Tinned Swedes Iron Upholsterers' Tacks.....dis 75±10 @ 75±10±½
Gimp and Lace Tacks.....dis 75±10 @ 75±10±½
Tinned Gimp and Lace Tacks.....dis 75±10 @ 75±10±½
Swedes Iron Trimmers' Tacks.....dis 75±10 @ 75±10±½
Swedes Iron Miners' Tacks.....dis 75±10 @ 75±10±½
Swedes Iron Bill Posters' or Railroad Tacks.....dis 75±10 @ 75±10±½
Copper Steel Tacks, all kinds (Swedes Iron price list).....dis 80 @ 80±½
Copper Tacks.....dis 80±10 ±
Copper Finishing Trunk and Clout Nails.....dis 70±10 @ 70±10±½
Finishing Nails.....dis 70±10 @ 70±10±½
Trunk and Clout Nails.....dis 70±10 @ 70±10±½
Tin Trunk and Clout Nails.....dis 70±10 @ 70±10±½
Sawyer Nails.....dis 70±10 @ 70±10±½
Wire Carpet Nail Patent Brads.....dis 70±10 @ 70±10±½
Hungarian Nails.....dis 70±10 @ 70±10±½
Chair Nails.....dis 70±10 @ 70±10±½
Zinc Glaziers' Points.....dis 80±10±½
Clear Box Nails.....dis 50±10 @ 50±10±½
Picture Frame Points.....dis 50±10 @ 50±10±½
Looking-Glass Tacks.....dis 50±10 @ 50±10±½
Brushing Carpet Tacks.....dis 50±10 @ 50±10±½
Shoe Finders' List Jan. 2, 1888.....dis 50±10 @ 50±10±½
Lining and Saddle Nails, List Jan. 1, 1888.....dis 50±10±½
Silvered.....dis 50±10±½
Jannaped.....dis 50±10±½
Double-pointed Tacks.....do 80 ±
Wire Carpet Nail Patent Brads.....dis 50±10 ±
Wire Brads and Nails.....dis 50±10 ±
Steel Wire Brads, H. & E. Mfg. Co.'s, list.....See Nails, Wire
Tap Borers.....Common and Rts.....dis 30±10 ±
Live Tap Borers.....dis 33½±½
Enterprise Mfg. Co.....dis 30±10 @ 30 ±
Clarks.....dis 33½ @ 35 ±
Springs, Measuring,—American.....dis 25±10 ±
Chesterman's.....Regular.....dis 40 ±
Thermometers.—Tin Case.....dis 80 @ 80±10 ±
Timble Scales.—See Scales.....dis 80 @ 80±10 ±
Ties, Bale.—Steel Wire, Stand'l list.....dis 50±10±½
Tinners' Shavers, &c.....dis 30±10 ±
Shaver and Razor (P. S. & W.).....dis 30 @ 35 ±
Punches and Punches.....dis 30±10 ±
Snips, J. Mallinson & Co.....dis 33½±½
Tinware.....dis 33½±½
Stamped, Jannaped & Pieced, list Jan. 20, 18°.....dis 70±10 @ 70±10±½
Fire Benders, Upsetters, &c.....dis 15 ±
Stoddard's Lightning Fire Upsetters.....dis 15 ±
Detroit Perfect Wire Bender.....dis 15 ±
Tobacco Cutters.....dis 33½±½
Enterprise Mfg. Co. (Champion).....dis 30±10 @ 30 ±
Wood Bottom.....do \$5.00 @ \$5.35
All Iron.....do \$4.25
Masbus Lock Co.'s.....do \$18.00, dis 50 @ 55 ±
Warrent's.....do \$24, dis 50±10 ±
Acme.....do \$20.00, dis 40 ±

Transm Lifters
Wollensak's Iron Bronze, Crown, Star, Eagle and Shield.....dis 25 ±
Wollensak's Bronze Metal, Class 3 and 4.....dis 25 ±
Wollensak's Bronze Metal, Class 3 and 4.....dis 25 ±
Wollensak's Real Bronze or Nickel Plate.....dis 60±½
Excelsior.....dis 50±10±½
Law's.....dis 50±10 ±
Rayson's Universal.....dis 40 @ 40±10 ±
Traps.....dis 60 ±

Rams
Newhouse.....dis 35 @ 40±½
Omelid Pattern.....dis 70 @ 70±½
Game Blake's Patent.....dis 40±10±½

Mice and Rat
Mice and Rat Choker.....do holes 11±18±
Mouse, Round Wire.....do \$1.50, dis 10 ±
Mouse, Cage, Wire.....do \$2.50, dis 10 ±
Mouse, Catch—em-alive.....do \$2.50, dis 15 ±

Moose, "Bonanza Mouse, Delusion.....
Cat, "Decey".....
Cryelone.....
Hotchkiss Metallic Mouse, E-hole traps.....
In full cases.....
Trawlers.—Lothrop's Brick and Plastering.....
Reed's Brick and Plastering.....
Dixon's Brick and Plastering.....
Clement & Eyward's.....
Rose's Brick.....
Braze's Brick.....
Worrall's Brick and Plastering.....
Garden......
Priera.—Butter and Cheese.....
Truckee Warehouse, &c......
B. & L Moore Co's list 1893.....
Tables. Boiler.—See Pipe
Twine......
No. 9, Flax Twine, ¼ and ½ Balls.....
No. 12, " " and ¾
No. 13, " " and ¾
No. 14, " " and ¾
No. 16, " " and ¾
No. 204, Mattress, "and ¾
Chalk Line, Cotton.....
Manila Line, Linen,.....
E-Ply Hemp, ¼ and ½ Balls (Spring Twine).....
E-Ply Hemp, 1 ½ Balls.....
E-Ply Hemp, 1 ½ Balls.....
Cotton Wrapping, 6 Balls to 2.....
2, 3, 4 and 5 Ply Jute, ¼ & ½ Balls.....
Wool......
Paper.....
Cotton Mops.—6, 9, 12 and 15 lb to do so.....
Vices......
Solid Box.....
Fishel—
Fisher & Norris Double Screw.....
Stephens'.....
Parker's.....
Wilson's.....
Bonney's.....
Miller's Falls.....
Trenton.....
Merrill's.....
Sargent's.....
Beckus and Union.....
Prentiss Screw Ice.....
Prentiss.....
Simpson's Adjustable.....
Saw Vises......
Bonney's No. 2 & 3.....
Stearns'.....
Stearns's Silent Saw Vises.....
Hopkins'.....
Reading.....
Westworth.....
Combination Hand Vice.....
Owells Hand Vises.....
Sauer's Pipe Vises.....
Boxes......
Per lb.....
Wagon Jacks.—Daisy.....
Wagner Cutters......
Smith's Patent.....
Johnson's.....
Penny's.....
Appleton's.....
Waschers......
Use.....
Waschers.....
Note less than 200 m. 7 ½, add 1 ½, 5-m boxes 1 ½ to list.....
Wedges.—Iron.....
Well Buckets Galvanized.....
Hills.....
Iron Clad.....
Whiting's Flat Iron Band.....
Whiting's Wired Top.....
Well Wheels—3 in., \$2.25; 10 in., \$2.70; 12 in., \$3.....
Wire......
Market Br. & Ann. Nos. 0 to 18.....
Market Copper-red, Nos. 0 to 18.....
Market Galvanized, Nos. 0 to 18.....
Stone Br. Tinned Wire, Nos. 0 to 18.....
Stone Br. Ann'd, Nos. 16 to 18.....
Stone, Bright & Ann'd, Nos. 19 to 36.....
Stone, Br. & Ann'd, Nos. 37 to 38.....
Stone, Tin'd, Tin'd wire, Nos. 18 to 36.....
Tinned Broom Wire, Nos. 18 to 36.....
Galvanized Fence.....
Annealed Fence, Nos. 8 & 9.....
Annealed Grade, Nos. 10 to 14.....
Jarness, Inv. Jan. 18-'94.....
Copper, List Jan. 18, 1884.....
Hard Fence.....
Wire on Spools.....
Galvanizing Steel and Tinned Wire on Spools.....
Steel Wire, Galv. and Copper Wire on Spools.....
Steel Wire.....
Steel Music Wire, Nos. 13 to 30.....
Picture Wire.....
Barb Wire Safety Guards.....
Wire Clothes Lines.....
Wire Cables Netting, &c.....
Painted Screen Cloth, No. 33, 100 sq ft.....
Painted Screen Cloth, No. 33, 100 sq ft.....
Galvanized Wire Netting.....
Wire Leads.—See Bright Wire Goods.....
Wire Rope.—List May 1, 1886.....
Wrenches.—American Adjustable.....
Wrenches.—Metric Pattern.....
Baxter's Diagonal.....
Genuine.....
Mechanics.....
Standard.....
Technists, Sterling Wrench Co.....
Samson & Sessions Engineers.....
Samson & Sessions Standard.....
Pattern, Wrought.....
Harold Agricultural.....
Samson & Sessions' Agricultural.....
Sterling Wrought.....
Emis & Call's Patent Combination.....
Emis & Call's Metric Pattern.....
Emis & Call's Bridge Pattern.....
Emis & Call's Cylinder or Gas Pipe.....
Emis & Call's No. 8 Pipe.....
Allen's Pocket (Bright).....
Favorite Pocket (Bright).....
Febber's Patent Combination.....
Always Ready.....
Illigator.....
Monohue's Engineer.....
Eme, Bright.....
Eme, Nickelied.....
Diamond.....
Diamond Patent Steel.....
Wringers, Clarke's.....
Jan. 10, 1888, \$2.50 off.
Wrought Goods.....

NOVEMBER 7, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

Lake.....	@ 18 1/2
"Anchor" Brand.....	@ 18

Ground Bibbs and Stops.....	55¢ 10¢
Ground Stops, Hydrant Cocks. &c.....	55¢ 10¢

Red Venetian in oil.....ass't'd cans, 11¢ ; kegs, 8¢
Red Indian Dry. 9 @ 12¢
Rose Pink... 10 @ 13¢

THE IRON AGE

THURSDAY, NOVEMBER 15, 1888.

The Homestead 32-Inch Universal Mill.

In *The Iron Age* of November 1st, page 656, we published a general plan of the famous slabbing mill at the Homestead and Fig. 3 an elevation of the vertical rolls. It will be remembered that both sets of rolls are driven by special engines, the heating pits being grouped around the end of the feed table of the vertical rolls, distance between center and center of the vertical and the horizontal rolls is 10 feet, the latter are 32 inches in diameter and 60 inches long, being driven by their special engine in the manner shown in Figs. 4

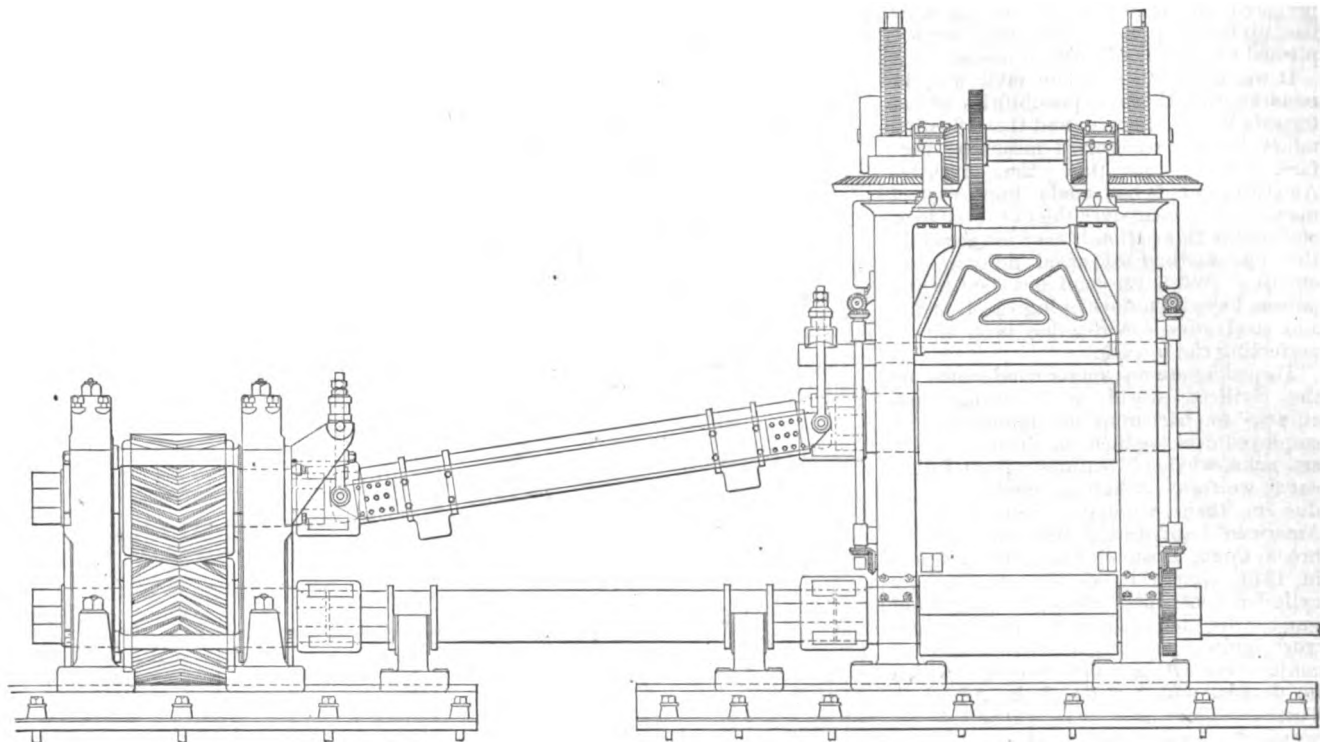


Fig. 1.—Elevation Horizontal Rolls.

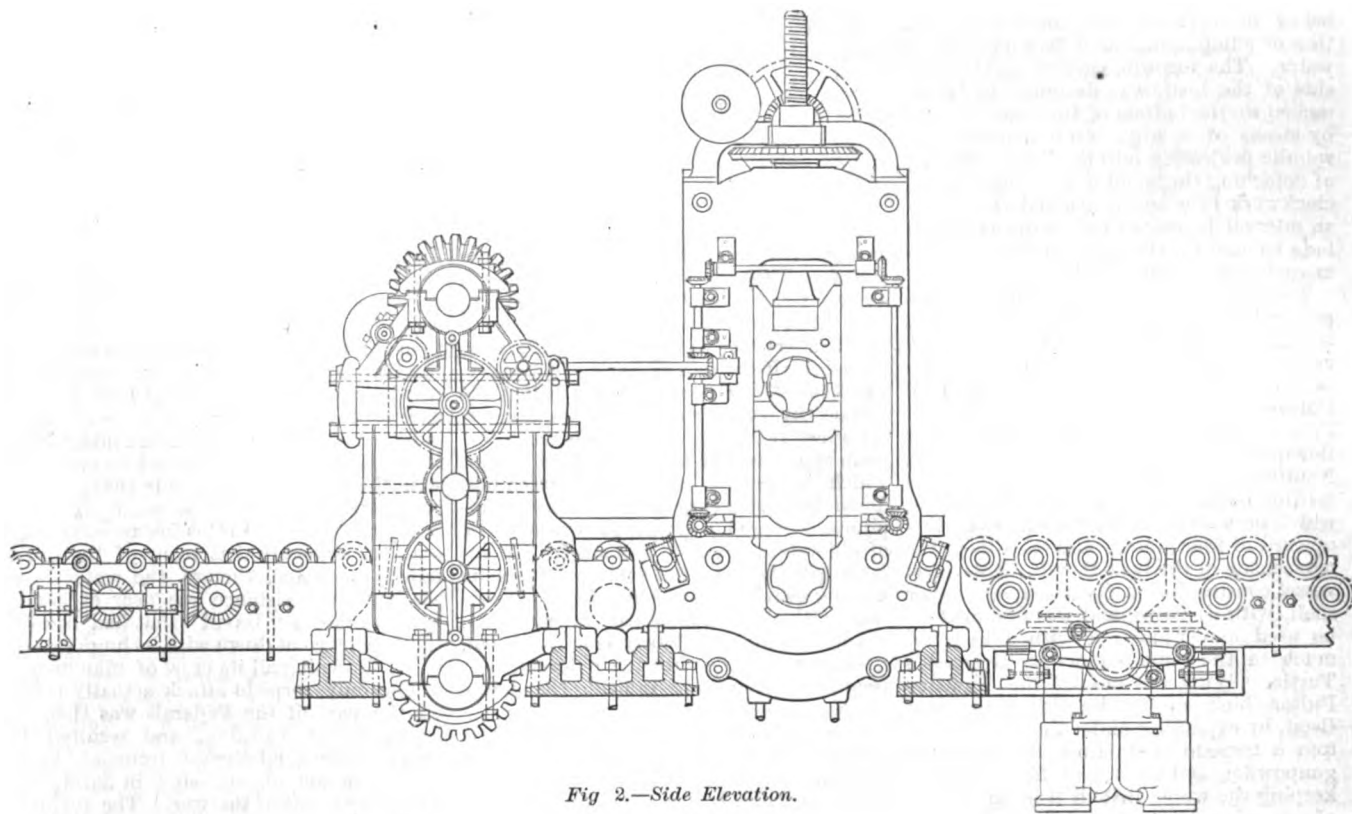


Fig. 2.—Side Elevation.

HOMESTEAD 32-INCH UNIVERSAL MILL.

Steel works, of Carnegie, Phipps & Co., Limited, of Pittsburgh, Pa. We present herewith drawing of the 32-inch Universal Mill itself, Fig. 4 being a general plan, Fig. 1 an elevation of the horizontal rolls, Fig. 2 a side elevation of both sets of rolls,

while the shear is located at the end of its table, a continuation of the table of the horizontal rolls. A glance at Fig. 3 will show how the vertical 20-inch steel rolls are driven. They are set in the manner which can be traced in Figs. 2 and 3. The

and 1, which illustrate also the arrangement for lifting and lowering the rolls. The ingot manipulator is shown in Figs. 4 and 2. In the case of both sets of rolls an ingenious arrangement is provided which it is somewhat difficult to trace in

our drawings for transmitting to a gauge an exact measure of the movement of the rolls to or from one another. This allows for adjustment up to a very small fraction of an inch. It is in clear sight of the operator, who can set his rolls to a nicety after every pass.

Torpedo Warfare.

Lieut. W. S. Hughes, U. S. N., has prepared an interesting *résumé* of what has, up to the present time, been accomplished in the line of torpedo warfare.

It was not until our late civil war, he remarks, that the vast possibilities of the torpedo became known, and these floating mines became recognized means of warfare. Since that time the inventive American mind has made improvement upon improvement over the old torpedoes, and to-day this nation is very far ahead in this one method of naval defense and offense. While England and Continental powers have been developing the ironclad and steel guns America has been slowly perfecting the torpedo.

Torpedoes are no longer condemned by the civilized world as "infernal machines," too barbarous and inhuman to be employed even against an enemy. They are acknowledged features of all future naval warfare. Whatever credit may be due to their originator belongs to an American, Capt. David Bushnell, of Saybrook, Conn. Bushnell's torpedo, designed in 1775, consisting simply of a copper cylinder containing 20 or 30 pounds of gunpowder and provided with a clockwork igniter, was intended to be used in conjunction with a submarine boat which he devised and christened the American Turtle. This boat was propelled by means of a small screw worked by hand. It carried but one man, and contained sufficient air to permit him to remain submerged nearly half an hour. The depth below the surface was regulated by admitting or pumping out a certain quantity of water. The torpedo, carried on the outside of the boat, was designed to be attached to the bottom of the hostile vessel by means of a large screw worked by a spindle projecting into the boat. The act of detaching the spindle set in motion the clockwork fuse, so constructed as to allow an interval to elapse before the explosion long enough for the operator and his submerged boat to reach a place of safety.

Twenty years after the subject of torpedoes had been abandoned by Bushnell, it was revived by Robert Fulton, whose name was destined in later years to become famous as the inventor of the steamboat. Fulton's first experiments were made in France, where, under the patronage of Bonaparte, then First Consul, he built the Nautilus, one of the most successful submarine boats ever constructed, and in which he was enabled to remain submerged upward of four hours, and to direct the movements of the boat at will. This novel vessel consisted of a cigar-shaped copper shell, with iron ribs, and was designed to be used in conjunction with a torpedo, much in the same manner as Bushnell's Turtle. With the aid of the Nautilus Fulton blew up an English brig, near Brest, by exploding under the vessel's bottom a torpedo containing 20 pounds of gunpowder, and succeeded for a time in keeping the whole British fleet in a state of apprehension. Notwithstanding this success, the failure of an attempt to destroy one of the channel squadron so disappointed Bonaparte that he summarily withdrew his financial support.

Fulton then crossed over to England, and, under the name of Dr. Francis, offered his invention to the enemies of his former patron; but Mr. Pitt, the British Prime Minister, after considerable vacillation finally decided "not to encourage a

mode of warfare which, if successful, would wrest the trident from those who then claimed to bear it as the scepter of supremacy on the ocean." Fulton was followed by Col. Samuel Colt, of Hartford, Conn., better known as the inventor of the revolver. The chief peculiarity of Colt's torpedoes was the employment of electricity to explode them, and to him belongs the honor of having first used in actual practice an element that has since assumed an all-important part in torpedo warfare. Although Colt's introduction of an electric fuse marks a distinctive epoch in the development of the torpedo, it was not until the late rebellion that its formidable character as a weapon of war began to be generally realized. The Confederates, having no navy, resorted to the use of torpedoes to protect their harbors from Federal gunboats. A "torpedo bureau" was established at Richmond in the first year of the war which employed upward of 500 men, and official records show a list of 25 Federal vessels totally destroyed and five seriously injured by Confederate torpedoes.

The torpedoes used were generally of a simple type. One of those most frequently

was held just below the surface of the water by a rope attached to an anchor, and had a number of the sensitive fuses before described, so that the shock from a passing vessel would cause an explosion.

A very formidable torpedo, called a "Devil Circumventor," was made of boiler iron, shaped like a turtle's shell, and containing sometimes more than a ton of powder. It lay so close to the bottom that it was not likely to be discovered, and was exploded by electric wires leading on shore. But these torpedoes were far from infallible, as was demonstrated by the fact that, after the capture of Charleston, one of the most powerful Federal ironclads, the New Ironsides, was found to have lain for several weeks directly over a "Circumventor," charged with 3000 pounds of powder, which repeated attempts had failed to explode.

Another form of torpedo employed had the outward appearance of a harmless lump of coal, but was in reality a rough mass of cast iron with a hollow core, containing from 5 to 10 pounds of powder.

A number of novel torpedo boats, generally known among the Federals as "Davids," were built by the Confederates

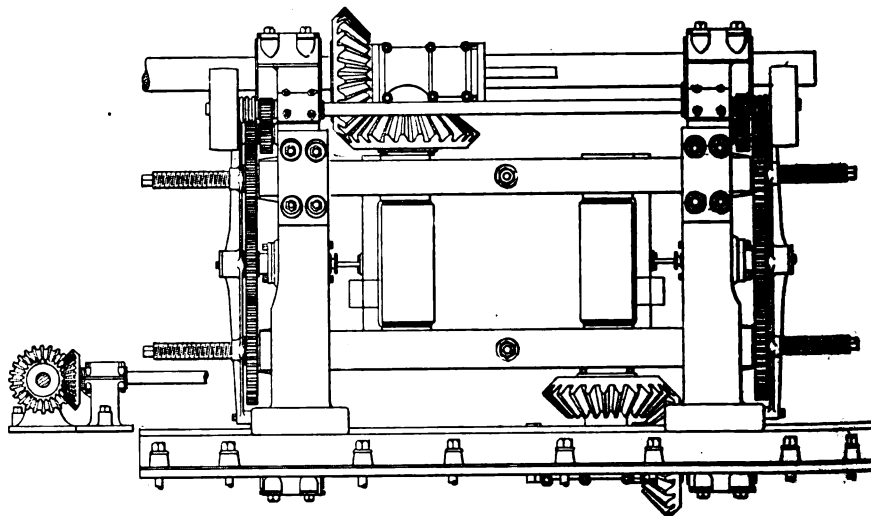


Fig. 3.—Vertical Rolls, Homestead Mill.

encountered was what is known as the "Frame Torpedo" which consisted of a series of cast-iron shells, each containing from 30 to 50 pounds of powder, bolted to the timbers of a large wooden frame, placed in rivers and at harbor entrances, and kept at the desired depth below the surface by ropes secured to an anchor. An aperture in the upper end of each torpedo was covered by a soft leaden cap, which inclosed a glass tube extending down into the torpedo, containing sulphuric acid and surrounded by a mixture of chlorate of potash and sugar. It was intended that if the enemy's vessel in passing over the frame should come in contact with the leaden cap it would be crushed, cause the glass tube to break and the acid to mingle with the chlorate, thus producing flame and igniting the charge of the torpedo.

The want of proper materials greatly restricted the operations of the torpedo bureau, and consequently soda fountains, oil tanks, steam boilers, demijohns and any similar articles that could be made to subserve the purpose were called into play. One of the most successful as well as one of the most easily constructed torpedoes was a lager-beer barrel, coated inside and outside with pitch to prevent leaking and hooped with strong iron bands. Wooden cones were secured to each end to prevent the current tumbling it over, and to give it additional buoyancy. The barrel, containing from 50 to 100 pounds of powder,

during the war. These little vessels were cigar-shaped, 30 or 40 feet in length, built of boiler iron, propelled by steam, and carried a crew of nine men. Little more than the smoke-stack was above water, and the torpedo, carried on the end of a wooden spar that projected 10 or 12 feet ahead of the boat, was exploded by a mechanical lock on coming in contact with the enemy's ship. Five attacks were made with these small boats, only that against the Housatonic, in Charleston Harbor, being successful. In this instance the ship sank so suddenly that many of the crew failed to escape, though the water was shallow and assistance was near at hand, while the little "David" that had caused the disaster went down with its huge antagonist, drowning all its crew of nine men.

The only torpedo attack actually made on the part of the Federals was that by Lieut. W. B. Cushing, and resulted in sinking the Confederate ironclad Albatross, an act unparalleled in daring by any other event of the war. The torpedo used consisted simply of a copper cylinder charged with 40 pounds of powder, which, upon pulling a trigger line, was exploded by a fulminate cap. It was carried on the end of a wooden spar projecting from the bow of an ordinary steam launch. The civil war revolutionized the science of naval construction. Ericsson's Monitor and the ironclad Merrimack startled the naval architects of the world. The death-knell of wooden ships-of-war was sud-

denly sounded by the booming of the guns in that famous "first fight of iron-clads" at Hampton Roads, and the new element of torpedoes had later on sprung into importance. Crude as torpedoes were at the close of the war when compared

to rise to the surface. While the full capabilities of this torpedo have not yet been developed, the latest trials demonstrate that it possesses the invaluable quality of always preserving an absolutely straight course when moving through the water.

carries a charge of 70 pounds of dynamite or gun cotton, and is exploded by a percussion lock in its forward point upon impact with the enemy's ship. The torpedo is protected by patents in the United States and in European countries, and a

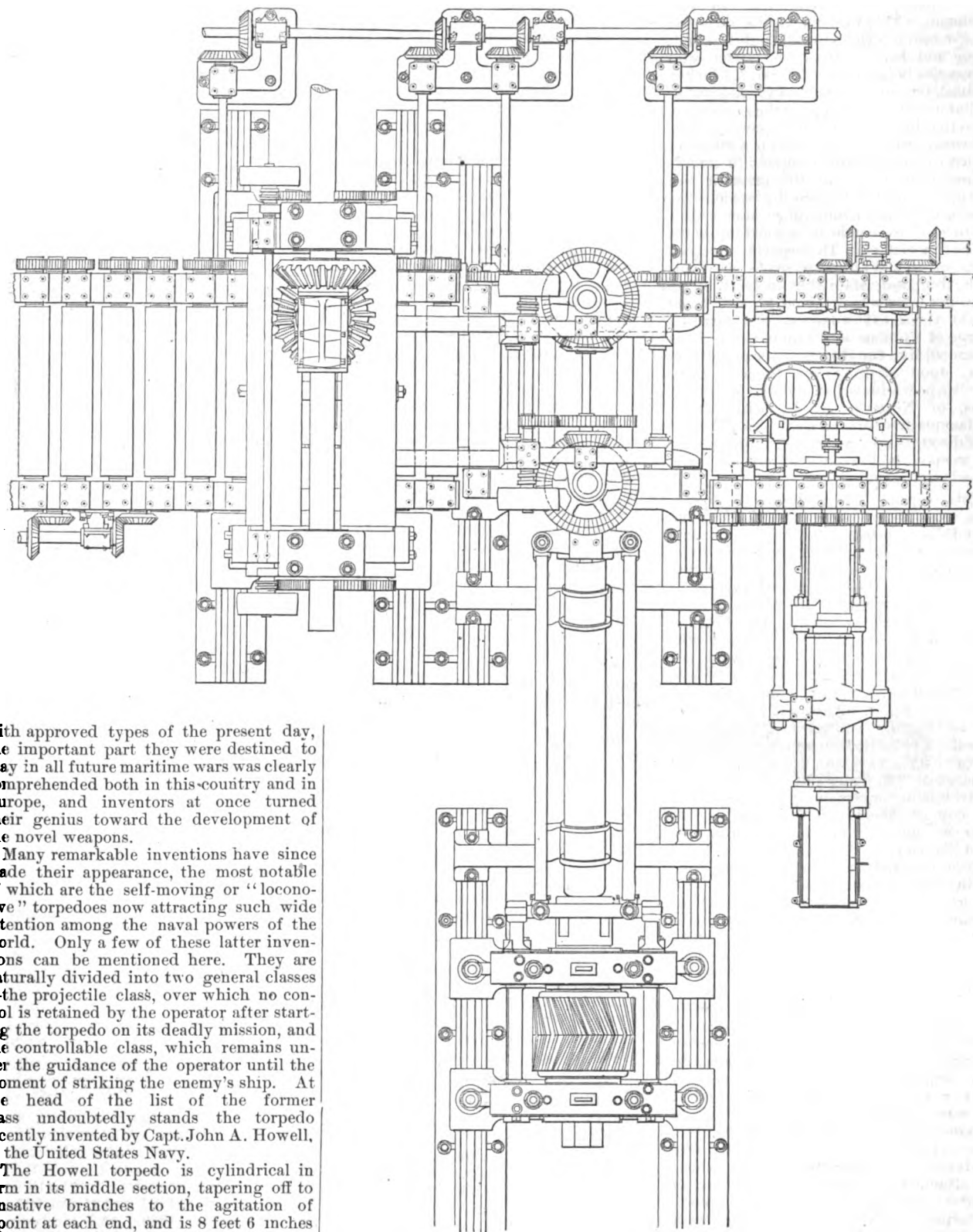


Fig. 4.—General Plan.

HOMESTEAD 32-INCH UNIVERSAL MILL.

with approved types of the present day, the important part they were destined to play in all future maritime wars was clearly comprehended both in this country and in Europe, and inventors at once turned their genius toward the development of the novel weapons.

Many remarkable inventions have since made their appearance, the most notable of which are the self-moving or "locomotive" torpedoes now attracting such wide attention among the naval powers of the world. Only a few of these latter inventions can be mentioned here. They are naturally divided into two general classes—the projectile class, over which no control is retained by the operator after starting the torpedo on its deadly mission, and the controllable class, which remains under the guidance of the operator until the moment of striking the enemy's ship. At the head of the list of the former class undoubtedly stands the torpedo recently invented by Capt. John A. Howell, of the United States Navy.

The Howell torpedo is cylindrical in form in its middle section, tapering off to sensitive branches to the agitation of a point at each end, and is 8 feet 6 inches long by 13 inches diameter. It is built of sheet copper, and is driven through the water by small screw propellers, the motive power being stored in a heavy steel fly-wheel within the torpedo, and to which a very high velocity of rotation is given by suitable machinery on board ship before the torpedo is launched. Upon reaching the water the torpedo is propelled by its own engines. It may be arranged to run at any desired distance below the surface, and is kept at that constant depth by side rudders, actuated by the pressure of the surrounding water, which work automatically and oppose any tendency of the torpedo either to sink or

The action of tides and currents for rough water causes little or no deflection from its original course, and the torpedo is practically independent of such outside forces. With only half the power which can be stored in its motor-wheel, the torpedo attained a speed of upward of 20 miles an hour for a distance of 200 yards, and had a total range of 750 yards. It

company with a capital of \$180,000 has been lately incorporated for its manufacture.

The Howell torpedo, like others of its class, may be effectively used in defending the narrow entrances to a harbor like that of New York, by discharging it at an approaching ship from behind an armor-clad fort or other suitable protection. But it is

mainly designed to be carried on board a very swift torpedo boat capable of overtaking the fastest ironclad, and upon reaching an effective range to be discharged at the hostile ship.

Another torpedo of the projectile class, and that which has been adopted by nearly every naval power of Europe, is the "Whitehead," the invention of an Englishman. This torpedo, in its outward form, resembles the Howell, but is much larger and heavier than the latter—the largest size being 19 feet long by 16 inches in diameter. It is designed for use under similar circumstances and in the same manner as the Howell. The motive power is compressed air, carried in a reservoir within the torpedo at a pressure of about 70 atmospheres. The secret of the inventor lies in the automatic device by which the pressure of the surrounding water causes the torpedo to remain at a constant depth below the surface. The reports of recent trials of the Whitehead, made at Woolwich, England, state that a speed of 31 miles per hour was attained for a distance of 400 yards. The largest size carries a charge of 93 pounds of gun-cotton. It is exploded, like the Howell, by a percussion lock, upon striking the enemy's ship. The torpedo invented by Mr. W. Scott Sims, of Newark, N. J., with whom the famous inventor and electrician, Thomas A. Edison, is now associated in perfecting the weapon, is the only purely electrical torpedo yet invented.

This torpedo differs widely in appearance from those before mentioned. The Sims-Edison belongs to the controllable class—that is, while attacking the enemy its movements are under control of the operator until the moment of explosion. The torpedo consists of a cylinder of copper with conical ends, is 28 feet long by 21 inches in diameter and is supplied with a screw propeller like those already described. The hull is attached to a hollow copper float, which moves upon the surface of the water, by upright rods about 4 feet in length. The power by which the torpedo is propelled, steered and exploded is electricity. It carries in its forward end a charge of 400 pounds of dynamite. An electric cable 2 miles long and containing two copper wires is coiled within the torpedo and unwinds as the latter proceeds upon its course. The cable is connected with a dynamo machine on shore, one of the wires being employed to supply the requisite electric current for working the engines, while the other controls the steering machinery. The torpedo is intended principally for harbor defense, the operator, stationed at some place of safety on shore, sending it out to intercept an approaching hostile ship, and causing the explosion at the instant of impact with the enemy by closing the circuit of an electric fuse. The inventors, however, claim that their invention may also be effectively employed for naval aggressive purposes on board ship, and propose to have one or more of the torpedoes travel in the water about 100 feet in advance of an ironclad ram, to which it is attached by its cable, and in making an attack upon a hostile ship to explode the torpedo as it comes in contact with the enemy just before the act of ramming. The control of the operator over the movements of the torpedo is very complete so long as the steering mechanism and insulation of the cable remain intact. By simply increasing, weakening or reversing the current passing through the "steering-wire" he can easily cause the torpedo to turn to the right or left, move in a circle or return to the point from which it started. The torpedo attains a speed of about 11 miles per hour, and can be sent out a distance of 2 miles. In order that its position may be always known to the operator two guide rods project upward

from the float a distance of 2 or 3 feet, and carry small globes by day and differently colored lanterns at night, so screened as to be invisible to the enemy.

The American invention known as the "Controllable Auto-Mobile Topedo" is another type of the class we have last described, but it differs from the Sims-Edison in some important respects. Like the latter, it is steered by an electric current conveyed through a cable, but the motive power is carbonic acid gas contained within the torpedo itself. This gas, as is well known, becomes a liquid when subjected to a pressure of about 600 pounds per square inch. The liquid gas is carried in a small iron reservoir near the center of the torpedo, and on its way to the engines passes through 100 feet of coiled copper tubing, during which it is expanded again into a gaseous state by intense heat produced by the chemical action of a mixture of dilute sulphuric acid and quicklime. This torpedo has developed a speed of 20 miles per hour, the highest that has been yet attained by its class, and has a range of 1 mile. It is made of copper, and is 36 feet long by 22 inches in diameter. It is attached to a hollow copper float, which moves upon the surface of the water, by upright rods about 3 feet in length. The float is itself about 42 feet long, and, being filled with cotton, lamp-black or some similar light substance, may be repeatedly perforated by the enemy's bullets without destroying its buoyancy. Projecting 2 or 3 feet above the float are two guide rods, carrying small flags, which enable the operator to know the position of the torpedo. When used at night small lanterns are substituted for the flags. The torpedo is under perfect control of the operator. An electric cable, one end of which is connected with a storage battery on shore, is coiled in the middle section of the torpedo, and unwinds as the latter runs its course. Upon passing an electric current through the cable one end of a magnetized lever is attracted, which communicates its action to the steering machinery and turns the torpedo to the right. When the current is reversed the opposite effect is produced and the torpedo moves to the left. A series of trials of the invention was recently made at College Point, L. I., before a commission of French and Turkish officers, who reported favorably upon its action to their respective governments. Still further trials are soon to be made in France. The torpedo carries a charge of 200 pounds of gun-cotton or dynamite, and is exploded by a percussion lock upon impact with the enemy's vessel.

Lieutenant Hughes gives also brief descriptions of Captain Ericsson's torpedo gunboat Destroyer, the Stilleto, and several of the submarine boats which have of late been brought out.

The Paris Exhibition.—The United States Commission to the Paris Exposition of 1889 has issued a circular, from which we quote: "It may be well to call the attention of manufacturers and others who wish to make exhibits at the Universal Exposition at Paris next year to the limited time for preparation. The allotment of space takes place on November 15, and shipments by steamer begin in January. The amount of space allotted to the United States is being filled up by applicants from all parts of the country. The commissioners are progressing with their work on a basis of absolute impartiality. It is simply a case of first come first served. According to the provisions of the French Government, there is to be no charge for space occupied by exhibitors. Moreover, as it is the intention of the United States Government in participating in this exposition to demonstrate the merit and comparative excellence of our products and

manufactures, the commissioners will forward, free of freight between New York and the exposition, going and returning, all articles received for exhibit. The sum of \$250,000 was appropriated to be used under the direction of the Secretary of State to defray all expenses. All communications must be addressed to the Commissioner-General, William B. Franklin, or the assistant commissioner-general, Somerville B. Tuck, whose offices are in the Washington Building, No. 1 Broadway, New York. The French Commission will not correspond with foreign exhibitors."

Oil as Fuel at South Chicago.

We have received from E. C. Potter, vice-president of the North Chicago Rolling Mill Company, Chicago, the following interesting communication with reference to the use of oil for fuel at the South Chicago plant of that company:

We have a battery of 14 boilers in our converting department, operated with fuel oil supplied through the medium of the Reid burner. The returns for the month of October relative to the consumption of oil as compared with the coal consumption under these same boilers, show that 3 6-10 barrels of 42 gallons to the barrel do the work of 1 ton of Indiana block coal. The cost of the oil is slightly under the cost of the coal. The great saving in the use of oil is found in the saving of labor for stoking, for wheeling out ashes and for unloading coal. When using coal 25 men were required to operate this battery of boilers for 24 hours. With the use of oil 4 men accomplish the same work. Considerable saving over coal in the cost per ton of ingots turned out of this department is also effected by the use of oil. The efficiency of the battery of boilers is materially increased, and the cost of maintaining is very materially lessened, as the oil flame seems to be much less severe upon the boiler than that of coal. There is practically no smoke, no ashes, no dust or dirt of any kind. The odor of oil is so slight as to be scarcely appreciable. The oil fuel is clean, easily handled and in every way thoroughly satisfactory, and as a fuel for raising steam, in my estimation, is second only to natural gas. We expect to equip our entire plant with oil as fuel for steam raising at the earliest possible day.

The Supply of Currency.—The *Bulletin* shows the changes in the money circulation during the past month and year in the following table, giving the actual amounts of currency in the hands of the people, so far as it can be shown by Treasury records, at the dates named:

Money Circulation of the United States.			
	Nov. 1, 1887.	Oct. 1, 1888.	Nov. 1, 1888.
Gold coin.	\$302,585,770	\$377,329,865	\$380,016,817
Silver dollars.	62,934,625	57,959,356	59,901,350
Subsidiary silver.	51,290,061	52,020,975	52,571,712
Gold certificates.	99,684,773	134,538,190	140,613,658
Silver certificates.	180,713,957	218,561,801	229,783,152
U. S. notes.	331,419,950	300,052,053	309,867,696
Nat. bank notes.	267,883,223	237,578,240	235,217,283
Total.	\$1,303,512,349	\$1,334,310,280	\$1,407,971,688

The probability is that the money circulation of the United States on January 1, 1889, will be greater by a full hundred million of dollars than on January 1, 1887 (\$1,418,000,000 compared to \$1,318,000,000 on January 1, 1887, and \$1,384,000,000 on January 1, 1888), and surely such a comparison affords little reason to fear a deficient money supply.

There was more coke shipped out of the Connellsville region last month than ever before in the same time. There were 17,800 cars shipped over the various lines west of Pittsburgh. That amount does not include the coke that went East, nor that which was shipped to Pittsburgh. A carload of coke will average about 18 tons. The aggregate shipments for the last month amounted to 820,400 tons. Allowing 30 cars to the train, it would require 593 trains to haul the coke.

English Sewage and Sludge Pump.

We take from a recent issue of the *London Engineer* the annexed cut showing a section of a neat and simple type of pump, which should meet the difficulties experienced by sanitary engineers in the removal of semi-fluid matter. All complications of passages in the pump are avoided, as well as reversals of the fluid pumped, which passes through in a direct line unimpeded. The valves are large and the removable seats are dished in, formed somewhat like a saucer, the effect being that the material pumped is guided into the barrel and no corners or pockets are left where accumulations can take place. An important feature is that by slacking back four screw bolts and taking off the cover the valve seats, as well as the valves, are removable, but when in position the seats are held firmly against the face of the box.

In all pumps, especially where thick or gritty fluids have to be passed through them, the valves and seats are liable to damage, hence it is of great importance that a change can be quickly effected, also that an internally packed plunger be used in preference to piston pumps. The pump

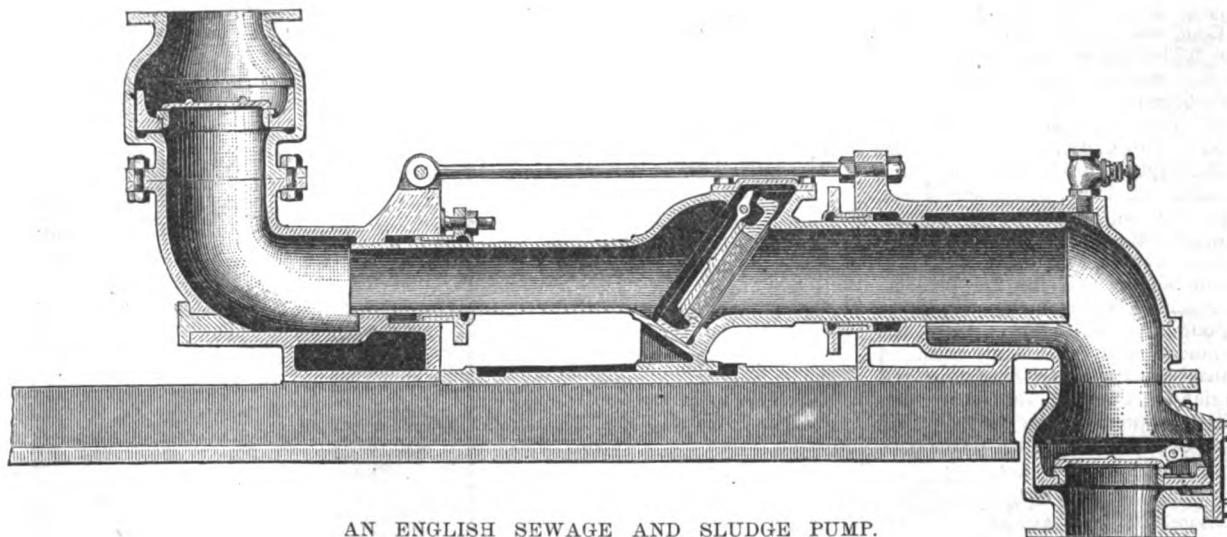
busiest moment in the evening is at 5.40 o'clock. At that instant ten trains simultaneously leave the various stations. In the 15 minutes between 5.30 and 5.45 50 trains in all go out. The busiest single hour is from 5 to 6 p. m. The busiest moment in the morning is 8.45 o'clock, when nine trains enter the stations simultaneously.

The Validity of Monopoly Contracts.

A recent decision of the Supreme Court of California concerning the contracts by means of which a combination of manufacturers had undertaken to suppress competition in the sale of lumber may be added to a long list of similar decisions. It appears that all the manufacturers of lumber at a certain point contracted to sell to a corporation the product of their mills, so far as such product should be required by the people of four counties. It was also agreed in the contracts that none of these manufacturers should sell lumber to any other buyer in those counties, the penalty for making such a sale being a fine to be collected by the corporation. One of the manufacturers in this lumber pool

the plaintiff company could not recover, on the ground that the combination was illegal and void, but also that the combination was a conspiracy. In New York it was held, in the case of Clancy against Onondaga Fine Salt Company, with respect to a similar combination, that "the end to be attained being illegal, the contracts and agreements entered into to secure the end must be equally so." And substantially the same decision was made in the case of Arnot against Pittston Coal Company, also in New York, and in cases of the same kind in Louisiana and Illinois.

Shooting Oil with Rockets to Troubled Waters.—The efficacy of oil in stilling troubled waters has often been demonstrated, but it has not yet become a distinct practice to carry a sufficient quantity to enable a ship to imbed itself in peaceful quarters while the sea around is angry and boisterous, so that a patent taken out in Germany, whereby oil may be fired in rockets to a given point, may be the means of enabling vessels to help smaller ships and less thoughtful mariners in danger, and thus add to the efficiency



AN ENGLISH SEWAGE AND SLUDGE PUMP.

illustrated should effect this. It is brought out by Mr. J. C. R. Oaks, of London, E. C. The pump can be driven either directly by a steam engine, duplex or single, by crank or other methods. As a vertical pump it appears well adapted to sinking purposes on account of its simplicity and the accessibility of the valves and seats.

New York Passenger Traffic.—The New York *Sun* has recently collected some statistics of the passenger traffic in and about New York. It is found that 1672 regular passenger trains leave the stations of New York, Brooklyn and Jersey City every 24 hours. The Long Island road's summer service runs on its various lines 577 trains daily. The next largest business is done in the depot of the Erie in Jersey City; where 288 trains daily enter and leave, and there are 216 in and out of the Grand Central Depot, and 204 in and out of the Pennsylvania Depot. Between 7000 and 8000 cars are employed daily in this traffic, and it is said that the number of people who entered and left the city by rail during the year ending May 1, 1888, was 40,188,000. Of this number the Long Island road carried about 8,000,000, the Pennsylvania 6,867,000, and the passengers entering and leaving the Grand Central Depot in the same year were 8,881,000. The daily average of passengers in and out is 110,000. It is said that the Long Island road carried 98,000 people to Coney Island on the 4th of July. The

broke his contract, and the corporation—representing the other members—brought suit against him. The court held that any one of the manufacturers could safely repudiate his contract. It said:

Plaintiff had an undoubted right to purchase any or all of the lumber it chose and to sell it at such prices and places as it saw fit; but when, as a condition of purchase, it bound the vendor not to sell to others, under a penalty, it transcended a rule the adoption of which has been dictated by the experience and wisdom of ages as essential to the best interests of the community and as necessary to the protection alike of individuals and legitimate trade. With the results naturally flowing from the laws of demand and supply the courts have nothing to do; but when agreements are resorted to for the purpose of taking trade out of the realm of competition and thereby enhancing or depressing prices of commodities, the courts cannot be successfully invoked, and their execution will be left to the volition of the parties thereto.

Among the other decisions which are recalled by this is that of the Supreme Court of Ohio in the case of Central Ohio Salt Company against Guthrie, in which the court refused to enjoin a producer from breaking his contract with a combination, saying: "The clear tendency of such an agreement is to establish a monopoly and to destroy competition in trade, and for that reason, on grounds of public policy, courts will not aid in its enforcement." Also the decision of the Supreme Court of Pennsylvania in the case of Morris Run Coal Company against Barclay Coal Company, in which it was held not only that

of the method of saving ships. The method has just been tried repeatedly between Bremen and New York. The rocket, to which is attached a cylinder filled with oil, can, it is said, be fired with accuracy from a ship to a required spot and explodes, pouring the oil where wanted. In one of the rockets fired experimentally the distances were from 1500 feet downward. By the explosion of five rockets at a distance of from 1200 feet to 1500 feet from the ship a space of from 1500 to 2000 square feet of water was covered with oil. The rocket was fired 900 feet against a gale. It is stated that the invention has been purchased by the North German Lloyd.

Mr. Geo. W. McKine, of Martin's Ferry, Ohio, has just completed his latest self-feeding attachment for cut-nail machines. He has placed it upon a new 10d machine from the Ashtabula Nail Machine Company, and the two machines, already ground, and in perfect condition for making first-class cut nails will be shipped at once to Leeds, England. The machines will not be taken down for shipment, but crated, so as to be ready for putting on belt in Leeds.

The Cowles Electric Smelting and Aluminium Company, of Lockport, N. Y., have issued a new pamphlet descriptive of the alloys of aluminium and silicon.

The Poughkeepsie Bridge.

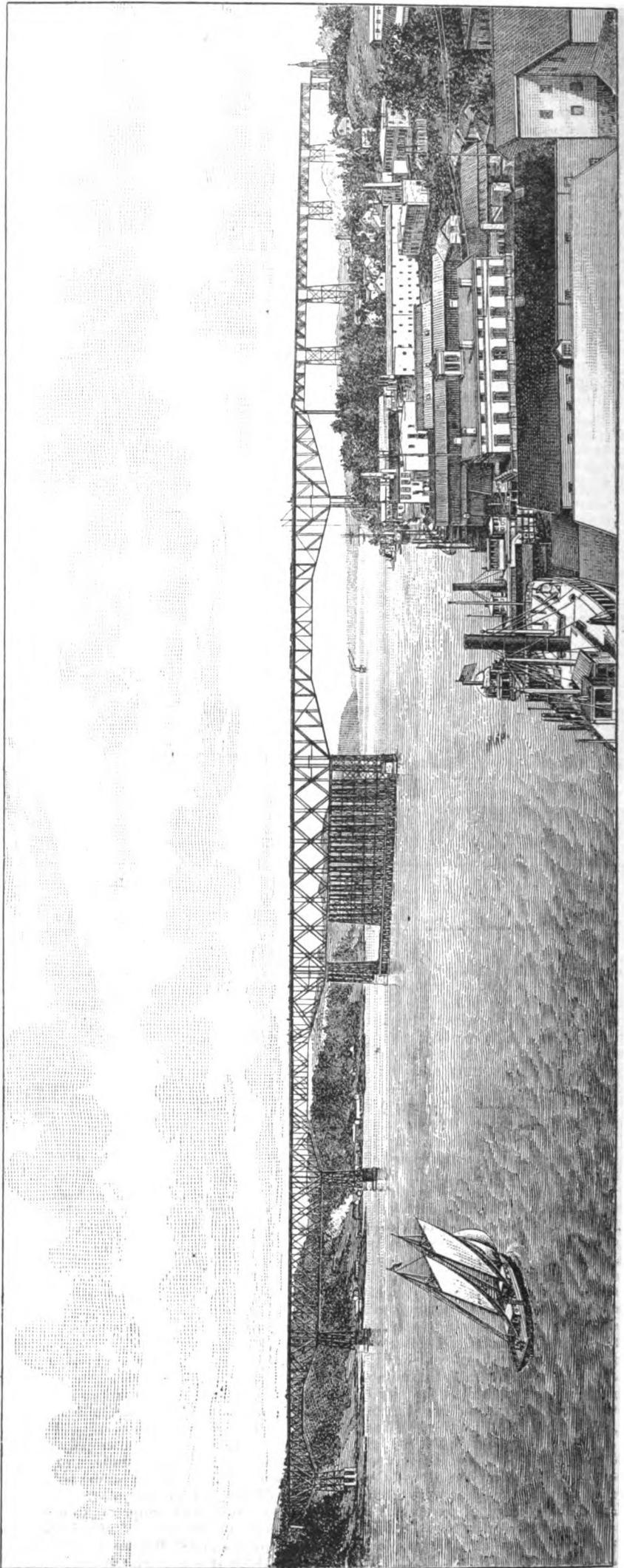
Lately an engineering undertaking has been completed which promises to be far reaching in its effects upon the business interests of an important section of our country, and which is of general interest, too, because from a technical point of view it is an achievement deserving of a place among the great successes of American engineers. The value of a bridge below Albany to the traffic of New England was recognized a good many years ago by so shrewd a railroad manager as J. Edgar Thomson, then president of the Pennsylvania Railroad, who subscribed the majority of the stock of the Poughkeepsie Bridge Company in 1871. Work was begun, but ceased in 1873. Mr. Thomson's death, and the panic of that year combining to lead a suspension of work, the Pennsylvania Railroad having voted that no new work should be undertaken without the consent of the stockholders, which was withheld. The project rested until 1876, when a contract was entered into with the American Bridge Company of Chicago. This company suspended work in 1878 until 1886, when the Manhattan Bridge Building Company, having acquired the rights of the American Bridge Company, made a contract with the Union Bridge Company for the entire structure complete. The organization now has at its head such men as Simon Cameron and Henry McCormick, of Harrisburg; Arthur Brock, of Lebanon; Morton McMichael, Charlemagne Tower, Jr., Henry C. Gibson, and W. W. Gibbs; C. H. Hart, of Philadelphia, and J. I. Platt, of Poughkeepsie. John S. Wilson, until lately general freight agent of the Pennsylvania Railroad, has been recently elected president.

The immediate, and for the present, most far reaching result of the completion of the Poughkeepsie Bridge will be the direct connection by an all-rail route of the Pennsylvania anthracite regions and New England. The reduction in the distance will be appreciated by the following figures, taking Scranton as an illustrative point :

	Via Albany.	Via Pough- keepsie.
Scranton to Springfield, Mass.	305	216
Hartford, Conn.	331	209
Boston, Mass.	408	314
Providence, R. I.	420	290

The possible connections of the Poughkeepsie Bridge on the east side of the Hudson River would be the Hartford and Western Railroad, the New York and New England from Hopewell Junction, the Central Massachusetts, the Boston and Albany, and the New York and Harlem from Brewster's Station. On the west side, the Walkill Valley and West Shore, the Lehigh and Hudson, the New York and Oswego Midland, and the coal roads. The Vanderbilt interest is now building connections with the bridge, the intention being to run the passenger cars from the New York Central depot via the New York and Harlem, thence to Hopewell Junction on the New York and New England, thence to Poughkeepsie, across the Hudson River, to a point on the Walkill Valley Railroad to Kingston, and from there on the West Shore to the Catskills and West. It is the intention further to send their large New England passenger traffic to the South from Boston via the Poughkeepsie Bridge and the West Shore Railroad to Jersey City, instead of to New York and ferry. By this new route, 1½ hours will be saved from Boston to Jersey City, and the annoying transfers will be avoided.

Concerning the technical details of the work we are indebted for the following data to a paper read by John F. O'Rourke before the American Society of Civil Engineers, which is about to be issued by that



THE POUGHKEEPSIE BRIDGE, BUILT BY THE UNION BRIDGE COMPANY.

society: In September, 1886, operations were begun. A line, practically the same as the old one, was adopted, surveys and borings were made and a profile obtained, from which the location of the piers was determined. The former design was for rectangular trusses of equal lengths. The location of the second span of the new design was fixed by the existing pier, and its length of 525 feet by the 500 feet of clear span and the 25 feet of mason required. The same length of span to the west would place Pier 1 in the West Shore Railway tracks. A pier on the east slope of the railway would be inadmissible. The most available site was on the bluffs west of the highway, and this was selected. By this time a cantilever design had been decided on, and the 530 feet center to center of end pins necessary to reach these bluffs was made common for all three cantilever spans. This clear span, with the half-widths of towers added, made the spans next the shores 548 feet and the center span 546 feet, which, with the two connecting ones of 525 feet, center to center of piers, located Pier 6 in the face of the rock on the east shore. The total length between anchorages was thus established at 3093 feet 9 inches, the total length, including viaducts, 6767 feet 3 inches. The charter fixed the bottom of trusses at 130 feet above high water, so the height of trusses proportionate to the spans required the adoption of 212 feet above high water as the grade of base of rail. The west approach has a rise of 66 feet per mile westward out of the valley of the Hudson, and the same grade was adopted on the viaducts, since it did not further limit the size of trains.

The borings showed the river bottom to be composed, for more than 100 feet below high water, of various combinations of mud, clay and fine sand, too soft for building upon. Underlying this pasty stuff was a very firm and hard stratum of rather coarse sand, beneath which was gravel, and, about 140 feet down, solid rock extending from shore to shore.

The general design of a pier is a crib and grillage, extending from the gravel to 10 feet below high water; on this is the masonry to 30 feet above high water, upon which is a steel tower 100 feet high to pedestals of trusses. The cribs are practically alike. The base is 60 x 100 feet, and the height 104 feet. It is built of 12 x 12 inch white hemlock, except the bottom course, which is of white oak.

The cribs were built for some height on ways and launched, building being continued alongside a wharf until the draft was nearly the depth of the river. It was then taken to the pier site, anchored, set, the weighting pockets loaded with gravel to keep the top at a convenient distance above the water and built upon until it was embodied in the mud. Weighting, building and dredging were then carried on with more or less continuity until the crib reached its final resting place. Then all the loose material was dredged out and the dredging chambers and pockets were filled with concrete until to within 2 feet of the top of the pockets, the remaining part being filled with brownstone and leveled by divers. A floating caisson was then towed to place over the crib, fastened with four anchors and the masonry began, to be followed by the stone towers.

For the erection of the two stone arms and for the two connecting spans false work was used, extending in the case of the latter to the bottom of the upper chord. A part of one of these is shown in our engraving, which is a reproduction of a photograph taken on August 31st of this year. Their noteworthy features were their great height and the permanent character of the framing and bolting masonry to secure stability. The depth of the water and the nature of the river bed

called for the use of compound piles 130 feet long, there being 528 piles for a span. The piles were 12 feet above high water and from them the trestle was extended to the bottom chord, an elevation of 130 feet.

The deck of the false work was occupied by four tracks. The two outer tracks were of 8-foot gauge, and upon these ran the large traveler for the erection of the span, which extended entirely across the space between these two outer tracks. The two rails next inside of these outer tracks were occupied by a hydraulic riveting apparatus, which spanned the space, 19 feet wide, between these two rails. A single track of 4 feet 8½-inch gauge at the center of the false work carried the cars conveying the material. Some of the pieces to be handled weighed more than 20 tons each, so the derricks and rigging of the false work and travelers had to be proportionately strong.

The hydraulic riveter was carried on a small traveler, so spanning the two middle tracks as not to interfere with the transportation of materials on them. The jaws were hung with differential pulleys from worm gear set upon projecting timbers of the deck, which revolved like a turn-table. By this means the jaws were readily adjusted to any rivet in the bottom chord. The towers at the ends of the span were first erected. Next, commencing at the fixed end, the bottom chord was laid along in place on camber blocks. The traveler then erected the span, commencing at the middle, and finishing each half successively. From the shore arms and connecting spans 160-foot cantilevers were erected by means of projecting travelers, almost identical with those used for erecting the cantilever bridge across the Niagara River. They were composed of two trusses, 118 feet long, of which the chords and vertical posts were of wood, and the ties and splice-plates of iron. These were supported on a heavy floor, extending from the rear end to within 50 feet of the other end, and were carried on 12 wheels, arranged in groups of 1, 2 and 3, respectively. Jack-screws bearing on the front floor beam relieved the wheels during the erection of a panel, and heavy hooks, under strong tension, clamped each end to the floor beams.

The 212-foot spans suspended from the ends of the cantilever arms were erected from the ends of the latter, and connected when they met at the center. The stiff bottom chord, except in the middle three panels, enabled each panel when finished to support the traveler during the erection of the next beyond. When the travelers met, the remaining three panels were completed. In connecting the center panel, the top opening was made a little long in order to let the chord section into place, and the bottom one a little short, that the pins might be driven easily into the eyebars. This was insured by adjustment struts between the arms and suspended span, which were shortened in the top chords and lengthened in the bottom by rollers separated with wedges. They were so arranged that by drawing them the ends of the top chord approached each other, and those of the bottom chord receded. After the span was connected, the wedges and rollers were removed and the trusses hung suspended.

According to the *Courier de la Meuse*, the Royal Gunpowder Factory, at Weteren, has succeeded in producing a variety of gunpowder equal in all respects to the Lebel powder, about which the French authorities maintain such a mystery. This new production has received the name of paper powder, and its ballistic properties are much superior to those of ordinary gunpowder, and there is, moreover, a complete absence of fouling.

NEW PUBLICATIONS.

PREPARING FOR INDICATION. By R. Grimshaw. Size, 5 x 7 inches; 56 pages. Published by the Practical Publishing Company. Price, \$1.

With the growing appreciation of the importance of the steam-engine indicator, and of its value to power users, the literature of the subject has naturally experienced a steady increase. The latest additions to it is in the shape of a small volume by Mr. Grimshaw, in which he has departed from his usual catechismal style and presents what he has to say in a straightforward, direct manner. As the title of his book implies, it gives instruction only so far as the preliminary operations are concerned, which must be carried out before the actual work of taking indicator cards can be commenced. These, as is generally known, embrace the making of cross head and ceiling attachments for the swinging levers and the piping, and in work before us an attempt has been made to take into account all possible conditions in practice. It is not infrequently the case that some ingenuity is required to make convenient and serviceable connections in testing an engine, the conditions often being of a temporarily perplexing nature, and where similar cases are already found worked out in a satisfactory manner there is no reason why one should not profit by them. It is here therefore that Mr. Grimshaw's book will probably be found useful. It is eminently practical in character, and contains nothing that an average engine attendant cannot easily understand and apply. We venture to say, however, that this book might have been offered to the public at a lower price. The subject itself does not cover a wide range; the book is consequently small, and while containing a fair number of illustrations these are comparatively poor specimens of the engraver's art.

The Lake Copper Product.—The following statement published by the Boston *Transcript* gives the product in "Mineral" carrying about 75 per cent. copper of the mines mentioned for October and for nine months of 1888, and a comparison with the outputs of the same mines in the preceding year, all in tons:

	—October, 1888.	1887.	Jan. 1 to Oct. 31, 1888.	1887.
Calumet & Hecla	3,914	3,057	26,299	25,845
Tamarack	625	501	6,226	3,449
Quincy	341	519	3,327	2,540
Atlantic	214	226	2,265	2,077
Osceola	185	185	2,029	1,694
Franklin	181	188	1,824	1,982
Huron	125	108	1,194	715
Central	102	122	926	953
Kearsarge	100	...	273	...
Copper Falls	80	...	642	360

Total 10 mines.. 5,867 4,901 45,018 39,615

The Copper Falls mill did not run during the second half of 1887.

The Ohio Valley *Manufacturer* reports that a conditional order was received by one of the iron mills of the Wheeling district from an eastern city, for 800 tons of steel sheets, No. 17, cut to shapes, for \$2.35 per 100 pounds, delivered at a point where the freight was 18 cents per 100, netting the company \$2.17. The purchaser stated that he could import it at even less figures and pay an ad valorem duty of 45 per cent., but preferred to give the order to an American mill, if it could be filled at those figures. After figuring closely on the order, it was found that it could not be filled without a loss of several thousand dollars, and that no mill in America could fill it with a profit, consequently it was rejected. The goods were to be used for the manufacture of skates.

The Southern Iron Industry.

Mr. James M. Swank, general manager of the American Iron and Steel Association, has contributed to the "Mineral Resources of the United States," for 1888, published by the Division of Mining Statistics and Technology of the Geological Survey, a paper from which is taken the following chapter on the recent rapid growth of the Southern iron industry:

The activity in the development of the Southern iron industry, which was so conspicuous in the latter half of 1885 and in 1886, was continued in 1887 and during the first half of 1888. This activity has been chiefly displayed in the erection of blast furnaces for the manufacture of pig iron. Since the beginning of 1886 there have been built in the States south of the Potomac and the Ohio rivers 21 large and well-equipped furnaces, and 14 furnaces were in course of erection in those States on July 1, 1888. Fifteen of the completed furnaces have been finished in 1888. Of the 21 completed furnaces 18 were built to use coke and 3 to use charcoal as fuel. Of the 14 building, 10 will use coke and 4 will use charcoal as fuel. These 35 new furnaces, built and building, are situated in the following States: Alabama, 13 coke furnaces built, and 10 coke and 3 charcoal furnaces building; Virginia, 3 coke furnaces built; Tennessee, 1 coke and 3 charcoal furnaces built; Kentucky, 1 coke furnace built; Georgia, 1 charcoal furnace building. Preparations are also being made to remove a coke furnace from Missouri to Kentucky. All of these new furnaces are of large capacity, and most of them rank among the best in the country.

Discarding all abandoned furnaces, the total number of completed furnaces in the States south of the Potomac and the Ohio, not including Missouri, which were in blast on July 1, 1888, or in a condition to be readily put in blast, was 109, and, as above stated, 14 furnaces were in course of erection in those States on that date. Of the completed furnaces, 57 use coke and 52 use charcoal as fuel. They are situated in the following States: Alabama, 23 coke and 10 charcoal furnaces; Virginia, 12 coke and 21 charcoal furnaces (and one of the charcoal furnaces is being changed to a coke furnace); Tennessee, 10 coke and 10 charcoal furnaces; West Virginia, 6 coke and 3 charcoal furnaces; Kentucky, 4 coke and 3 charcoal furnaces; Georgia, 2 coke and 2 charcoal furnaces; North Carolina, 2 charcoal furnaces; and Texas, 1 charcoal furnace. In the whole country there were on the 1st of January, 1888, 533 completed furnaces, not counting abandoned furnaces.

In addition to the foregoing enumeration, there are two entirely new and large coke furnaces now in course of erection at Sparrow's Point, on the Patapsco River, a few miles below Baltimore, Md., which may be classed among Southern iron enterprises. These furnaces will be completed this year. Two additional furnaces at the same place are contemplated.

A year ago there was much comment in Southern newspapers concerning the probable scarcity of a supply of good coke for the new Southern furnaces, the construction of which had then been completed or undertaken, and the prediction was freely made that some of the new furnaces would be compelled to remain idle until new coal fields could be found or fields already discovered could be developed. With the lapse of time it has been found that the supply of good coke from Southern coal fields has fairly, if not entirely, kept pace with the increasing demand for this fuel for furnace use. New coke ovens have been built in connection with newly-opened coal mines, and the quality of coke obtained from the coal of

some of the older mines has been improved by more careful methods of selecting the coal and making the coke. There is particularly no longer any apprehension of a scarcity of coke for the supply of the furnaces at Birmingham and its vicinity. There is still room, however, for further improvement in the quality of some Southern coke.

One of the most promising signs of an abundant supply of coke for Southern furnaces is seen in the success which has attended the coking of the celebrated New River coal in West Virginia and the no less celebrated Pocahontas coal in Virginia. The coke from these fields has been shipped to Carondelet, Mo., and Joliet and Chicago, Ill., at all of which places it has been used in blast furnaces in competition with Connellsville coke. New

Company, at Richmond, Va., made their first blow. They did not, however, continue in operation, as a necessity arose for changing the plans upon which they had been constructed. At Birmingham, Ala., the Henderson Steel and Mfg. Company built an experimental Henderson open-hearth steel furnace in 1887, to use pig iron made from native Alabama ores above the Bessemer limit in phosphorous, and on the 27th of February, 1888, the first steel ever produced in Alabama was successfully made at these works. The erection of a larger furnace is contemplated. But the manufacture of Bessemer steel by the basic process in the South has not yet been attempted.

In the manufacture into finished forms of the pig iron produced within her bor-

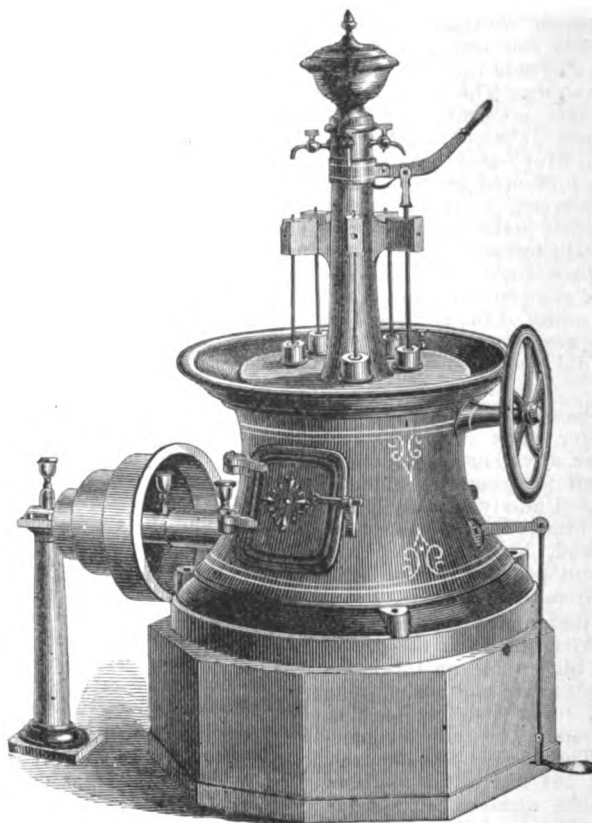


Fig. 1.—General View.

NUT-TAPPING MACHINE, DESIGNED BY MR. GEORGE W. BIGELOW,
NEW HAVEN, CONN.

River coke has also been shipped as far West as the silver mines of New Mexico. We stated a year ago that "railroad facilities in the South are being so perfected that but little inconvenience need be experienced in taking good coke from where it is made to where it is wanted, as, for instance, from Southwestern Virginia to Eastern Tennessee," and the shipping of New River and Pocahontas coke to the points above named illustrates the facilities and economy with which Southern coke may be taken long distances for furnace use.

During 1887 the South made some progress in the development of her steel industry, but not much. Two small Bessemer steel works were completed in the South in that year. The works of the Roane Iron Company, at Chattanooga, Tenn., made their first blow on May 7, 1887, and on that day the first Bessemer steel rail ever made in the South outside of Wheeling was successfully rolled at these works, which have since continued in operation. On October 10, 1887, the works of the Old Dominion Iron and Nail Works

ders the South has made considerable progress since we last referred to this subject. At Nashville, South Pittsburg, Chattanooga, Knoxville, Birmingham, Anniston and other points in the South may now be seen foundries, machine shops, and other reproductive iron enterprises which did not exist a year ago, and which would be creditable to any Northern State.

The Bigelow Nut-Tapping Machine.

We show on this page a sectional view of a nut-tapping machine designed a number of years ago by Mr. George W. Bigelow, New Haven, Conn., for the Joseph Hall Mfg. Company, of Oshawa, Ont., and built by them for their own use. The machine embraces a number of novel features, and an examination of the engravings will, therefore, not be without interest.

The sectional view, Fig. 2, shows all the essential details, and clearly explains the functions of the different parts, so that really very little description is neces-

sary. Power is transmitted from the horizontal cone shaft A to a vertical shaft, B, through the intervention of two bevel wheels, as shown. On the shaft B is mounted a large spur-wheel meshing with six spur-pinions, each of which is mounted on a spindle, *s*. Within each of these spindles is partially contained another spindle, *s'*, which is forced downward as far as the construction adopted will let it go by means of a coiled spring. The spindles *s'*, moreover, are slotted and furnished with keys which fit into slots in the small spur pinions. It is thus evident that

derstood, are fed down to the taps by a lever, D. The holders have openings, either square or hexagonal, according to the shape of the nut blank, and securely hold each blank while it is being tapped. A reservoir on top supplies the necessary oil. The machine has six spindles, as shown in Fig. 1, and was designed for tapping nuts, ranging from $\frac{1}{4}$ to $\frac{1}{2}$ inch. A spring brings the lever D back to its original position after having been forced down by the operator in feeding a nut blank. It will be understood that after a thread has been started in the blanks they

were six times as many boiler explosions in the United States last year as there were buildings burned, the advisability of insuring boilers at once becomes manifest.

The Denver Cable Road Castings.

It has been denied that the Denver Car Company let the contract for the manufacture of 5000 tons of cast-iron cable yokes to an English firm. The facts in the matter are these: Horace A. Keefer is a broker in Kansas City, who makes a business of bidding on such wares, and then filling his contracts with foreign goods, which, it appears, he can do at a good profit, and still underbid American manufacturers. Keefer bid \$38 per ton, delivered at Denver, in this case. The lowest domestic bid was \$38.90, which was considered a remarkably low figure for the work, and at which the prominent and responsible manufacturers of this country say it cannot be done without a loss. Keefer arranged with an English firm to fill the bill at \$33 per ton at Denver, thus leaving him a net profit of \$5 for his brokerage. It will be seen that while the company did not directly give the work to foreigners, the latter, through the ability of their agent, got the work, and English laborers will get the practical benefit of it, through the liberal margin of advantage which they have by reason of the cheap labor of that country. It has been denied that any contracts for cable railway material to be used in the United States have been placed in England. The following affidavit is convincing:

State of Missouri, County of Buchanan: J. M. Huffman, being duly sworn, deposes and says he is President of the Wyatt Park Railway of St. Joseph, Mo.. That said company did contract with Thalimer and Lighthall for all material and labor to build and equip about five miles of cable railway in said city of St. Joseph, and that said Thalimer and Lighthall did subcontract for engines, driving machinery, yokes and other castings to be used in construction of said cable railway with firms in England, and that there was sent to the city of St. Joseph a sample of said yokes for said cable railway that was cast in Bradford, England, on which was cast the following to-wit:

On one side: Thornton & Cribben, manufacturers, Bradford, England; on one side: A. H. Lighthall, 1888; and that there were stored in the United States bonded warehouses in the city of New York, July—, 1888, not less than 250 tons of said yokes awaiting shipment.

(Signed) J. M. HUFFMAN, President.
Subscribed and sworn to before me, a Notary Public, qualified and whose commission expires March 7, 1891, this 31st day of October, A. D. 1888.

(Signed) P. V. WISE,
(Seal.) Notary Public.
The above is a copy of original affidavit now in my office, 421 Olive street.

JAS. W. BELL,
President of Buck Stove and Range Company.

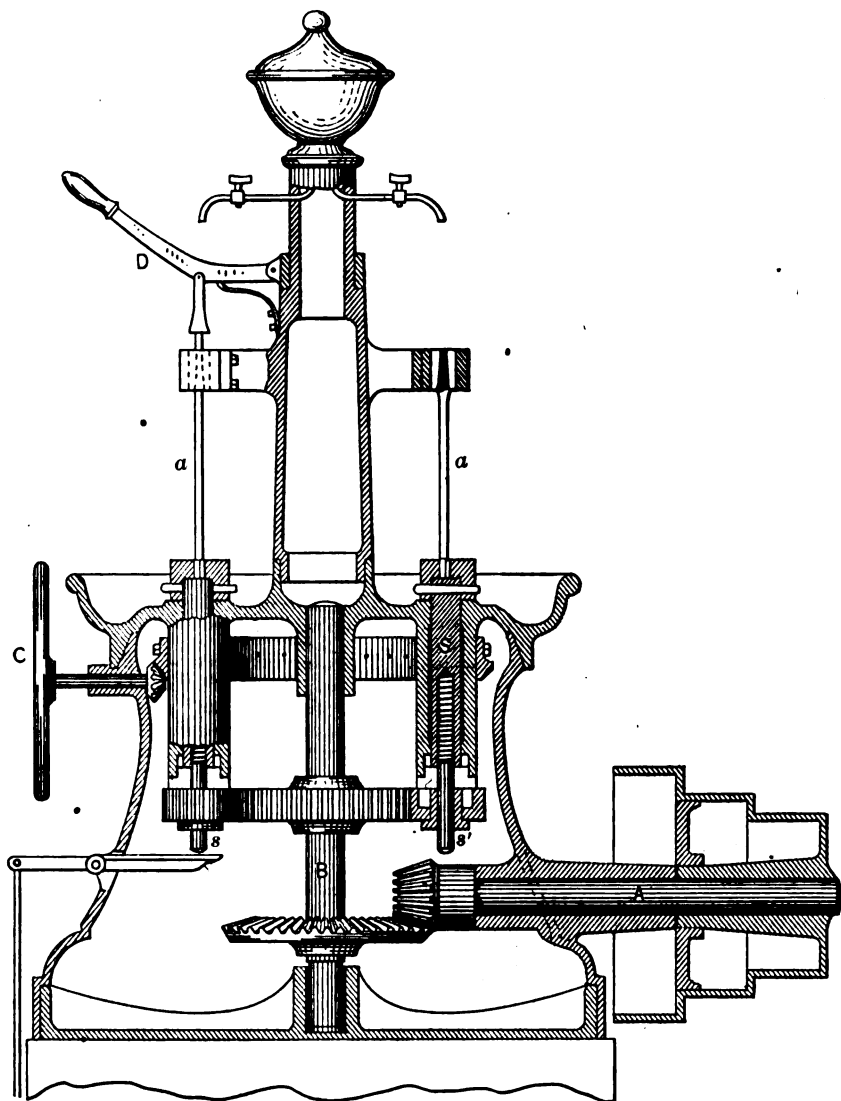


Fig. 2.—Vertical Section.

NUT-TAPPING MACHINE, DESIGNED BY MR. GEORGE W. BIGELOW, NEW HAVEN, CONN.

the motion of the shaft B is transmitted to all the spindles, *s*, and from these to sockets containing the taps *a a*. By means of a treadle, shown at the left of Fig. 2, operated by the foot of the attendant, the interior spindles *s'*, when at that side of the machine, can be forced upward against the pressure of the coiled spring. The spindles thus carry with them the keys fitted in the slots, and as a consequence the small pinions are allowed to run free on the spindles *s*, so that the taps *a a* remain stationary. A hand wheel, C, controlling a bevel pinion and circular rack, enables the attendant to hold the different taps at any point in their path, or to revolve them around to different positions, as desired.

The upper part of the frame of the machine proper is fitted with six holders for the nut blanks. These, it will be un-

derstood, are fed down to the taps by a lever, D. The holders have openings, either square or hexagonal, according to the shape of the nut blank, and securely hold each blank while it is being tapped. A reservoir on top supplies the necessary oil. The machine has six spindles, as shown in Fig. 1, and was designed for tapping nuts, ranging from $\frac{1}{4}$ to $\frac{1}{2}$ inch. A spring brings the lever D back to its original position after having been forced down by the operator in feeding a nut blank. It will be understood that after a thread has been started in the blanks they

There has been a steady and rapid growth in the boiler insurance in the United States in the past few years, says the *Investigator*. The necessity for such indemnity is constantly impressing itself upon the minds of the people, and the companies are preparing to meet all the demands made upon them. Three companies at present occupy the field, and they are sound institutions. Their aggregate assets January 1, 1888, were \$2,976,893.29; liabilities, \$1,193,849.06, and their surplus over all liabilities \$533,054.23. Thus it will be seen that the indemnity offered is of the strongest character, and when it is remembered that in comparison with the relative number of each there

A cylindrical pipe, flowing full, discharges less than the same pipe when only filled through a segment whose arc is 281° 30 minutes by 2–5 per cent., while the velocity is less by 9–5 per cent., the hydraulic inclination being the same. The full section discharges less, and also with less velocity, in other forms of pipes as well as in cylindrical. The scouring power of circular pipes flowing full is therefore less by nearly 10 per cent. than that of the same pipes filled through an arc of 281° 30 minutes, a new element to be considered in the arguments for and against circular pipe sewers.

The Committee of the Master Mechanics' Association appointed to consider the proper size for locomotive boilers has, in its report, given the following rule for cylinders with a stroke of 24 inch: $H=5.8 A$, where H = heating surface in square feet and A is the area of one piston in square inches.

THE WEEK.

The Treasury Department has authorized the allowance of drawback on exportations of so-called mattress fabric, manufactured at Hartford, Conn., wholly from wire made of imported steel rods, equal to the duty paid on the imported material, less 10 per cent. The Department declined, however, to allow drawback on completed wire mattress manufactured in part from domestic wood.

Sanitarians will consider a number of important subjects at the annual meeting of the American Public Health Association, to be held in Milwaukee, November 22-23. Reports from various committees will be presented.

The Haytian Republic is again on the verge of civil war, as Légitime, who at present fills the Presidential chair, is attempting to enforce the blockade of Cape Haytian, the headquarters to the opposition. Vessels entering or leaving are liable to seizure by the Government men-of-war. Cape Haytian is the only city of any importance along the entire northern coast of the island, and in bygone days was a rival of Port-au-Prince, the capital, in its wealth and society. Cape Haytian's reputation depends more upon what was once to be seen there before the earthquake and fire destroyed its buildings than what actually obtains at present. No steamers of the Clyde Steamship Company at this port will land at Hayti while the ports are blockaded.

The United States Minister to Japan, Gov. Hubbard, in a friendly chat with a correspondent, expresses confidence in the future of that interesting country. The advances the nation has made in the past two decades have no parallel in the history of civilization. The country has now railroads, telegraphs, a compulsory school system and a Government based on the plan of those of modern Europe. It is bringing machinery to the development of its industries and of its wonderful resources. Japan is a country of minerals, and its coal and iron will add to its national wealth. Agriculturally it is susceptible of great development, and only a small proportion of the land is now cultivated. The only American railroad in Japan is in Yezo, and it is intimated to me that the Government, in the extension of its railways there, will build them on the American plan. It is probable that American materials will be to a large extent used, and that, though the roads will be built under the direction of Japanese civil engineers, the materials and machinery may come from America.

A large quantity of firearms and ammunition were shipped from this city by the steamer Saginaw for San Domingo, and the Haytian minister, Preston, insists that they were intended for the use of the rebels in that country. The consignors were Hartley & Graham, of this city.

It now seems probable that four to six new States will be admitted to the American Union by the Fifty-first Congress.

The difficulty in making barrels fast enough is becoming serious in Minneapolis. With very little or no export trade the flouring mills have packed a very large proportion of their product in wood, and the coopers are pressed beyond their ability to supply the current demand.

The Lehigh Valley and Jersey Central Railroad companies are piling the South Cove channel in Jersey City, and are building docks above the piling. The increased depth of the channel will allow the largest vessels to come up to the docks. Tracks from the main lines of the railroads will be built to the end of the docks, and ships will be loaded from the cars direct.

Many of the large manufacturing companies at Fall River have recently held their annual meetings, at which full statements of business results have been made. From these accounts the following exhibit of capital, earnings for the past year and dividends declared is drawn:

	Capital.	Earnings.	Dividends.
Wampanoag..	\$750,000	\$157,550	\$86,250
Chace.....	500,000	115,000	37,500
Granite.....	400,000	136,000	64,000
Flint.....	580,000	102,858	58,000
Barnard.....	330,000	53,000	24,750
Merchants'...	800,000	125,720	60,000
Narragansett	400,000	67,143	32,000
King Philip..	1,000,000	137,105	60,000
Union.....	750,000	287,000	137,500
Sagamore....	600,000	133,000	78,000

To supplement these figures it may be added that at the annual meeting of the Amoskeag Mfg. Company, of Manchester, N. H., a month ago, it was stated that the company had cleared \$425,566 from their manufacturing operations during the year, out of which two 5 per cent. dividends had been declared, amounting to \$300,000, leaving over 4 per cent. surplus. During the year, moreover, a stock dividend of 33½ per cent. was made. These are, of course, exceptional statements, but they serve the purpose of showing that New England still leads in the cotton industry.

The new method of oil transportation by means of tank steamers is to some extent forcing stevedores and inspectors out of the business. Some idea of the expense that bulk transportation saves, and the consequent absence of work for the men, can be formed when it is stated that regular expenses to the extent of fully \$2300 are saved on every cargo of the tank steamers that leave this port, taking 20,000 barrels as the average size of each vessel. The agents of the bulk steamships will not admit that it is cheaper to carry the oil by the new method, though the fact that new vessels are being freely built is considered to be proof sufficient that there must be some money in it. The following statement shows the amount of money saved by the steamers in the way of outside charges. The calculations are made on the basis of the average-sized tank steamer, 20,000 barrels:

Inspection of stowage, 1c. per bbl.....	\$200
Inspection, oil and barrels, 2½c. per bbl.....	500
Stevedore's charges, 5c. per bbl.....	1,000
Dunnage, &c., \$30 per 1000 bbls.....	600
Total.....	\$2,300

Steamship men claim that the money saved in wharfage will easily cover the expenses of extra crew, coal and other items incidental to a steamer. It will consequently be seen that there is some reason to question the strict accuracy of the claims of the tank oil shippers to the effect that they do not save anything by shipping oil in bulk.

The National Exposition at Augusta, Ga., for which extensive preparations have been made, opened auspiciously on the 8th inst., and all the arrangements are now complete. The exposition building has a floor space of 7 acres, and is 900 feet long by 100 feet wide, with three cross sections, respectively 200, 300, and 400 feet deep. Besides space for exhibits it accommodates 15,000 visitors, and has over 2 miles of frontage in aisles. The oration was delivered by the Hon. James C. Black, a leading lawyer of Augusta. In the course of his address he called attention to the fact that Augusta had water-power equal to 14,000 horse-power; that her factories turn 200,000 spindles and employ 5000 hands; that they pay \$1,000,000 in annual wages, and that their product reaches \$5,000,000. He said the property of Georgia had increased in the last ten years over \$103,000,000, exclusive of railroad property, while railroad property had increased \$20,000,000, or 212

per cent. The property owned by colored people, he said, was in round numbers \$10,000,000, an increase in ten years of 85 per cent. At the conclusion of the addresses Mrs. Gordon, wife of the Governor, touched the electric key which started the engines and set the machinery in motion.

At a recent public meeting in Boston the statement was made that the manufacture of cotton is increasing much faster at the South than in New England. In 1879 the number of cotton factories in the Southern States was returned at 154; in 1887 the number had increased to 219, while now there are 235 mills in operation, 17 new ones almost ready to begin production and 40 more building. The inference to be drawn from these facts is, of course, that the cotton manufacturing industry has better prospects for growth at the South than at the North, so that the New England concerns are being severely crowded. Nevertheless, all of the important New England manufacturing companies have made money this year, and the stockholders of the Fall River Iron Works Company have just voted to erect four new mills, to have an aggregate of 186,000 spindles.

The Cincinnati Exposition, which closed a week ago, is said to have been a failure financially. The *Enquirer*, of that city, gives these figures: The deficit is between \$330,000 and \$340,000. This means an assessment of about 35 per cent. on the guarantee fund of \$1,050,000, and as there are about \$100,000 of the guarantee notes which are thought to be worthless, the guarantors may have to pay 40 per cent. The only assets of the exposition are the buildings, which will probably be sold at public auction.

The Cleveland Ship-Building Company launched the steel steam barge Transfer, built by the Michigan Central Railway Company, and is to be used as a railway ferry at Detroit. Her length over all is 280 feet, 45 feet 6-inch beam, 17 feet 3-inch hold and 75 feet from outside to outside of guards. It is estimated that she could break through ice 3 feet thick without injury, and could be sailed through ice 1 foot in thickness at a speed of seven miles per hour. Her screw wheel is 9 feet in diameter, and her side wheels are shod with heavy steel facings to assist in breaking ice. The power which is to push her through water or ice of above thickness is in four steel boilers 11 feet 6 inches, 16 feet long, or 4½ feet longer than the longest ordinary boilers on the lakes. These boilers have two domes 20 feet long and 48 inches in diameter, and one dome 10 feet long and 6 feet in diameter. These boilers will furnish steam for six cylinders; two 28 x 28 inches on each side for side-wheel engines, and two cylinders 28 x 36 inches for stern-wheel engine, each with separate condensers. Cylinders are double low pressure with horizontal engines. The latter have two steel spur gears 16 feet in diameter, all cut teeth, and two steel spur pinions 5 feet 6 inches in diameter, also all cut teeth. The whole cost of this remarkable steamship is \$325,000.

The United States Consul to Samoa, who left those islands last August, is about to represent at Washington the necessity for protecting the natives against German aggression. He returns to the United States in behalf of the people there, who number 35,000. The Germans, he says, had installed a clerk as a sort of premier to represent them and their interests, consisting chiefly of a mammoth trading store, kept by a firm with a long name, and a good deal of land acquired in trading operations. The islands, in his judgment, are the most valuable, beautiful and healthful in the Pacific, not even excepting the Sandwich Islands, and Germany is

fully awake to the fact. Cotton, coffee and dried cocoanut are exported in large quantities.

Work has commenced on the elevated railroads to be built in Jersey City for the Pennsylvania Railroad Company, and in 18 months it is probable the whole will be completed at a cost of about \$1,000,000. The plans call for a four-track railroad on a structure greatly resembling the Sixth avenue "L" road in this city. Owing to the fact that the burdens it will have to carry will be much more weighty than those carried on the "L" roads the iron used in the construction will be much heavier and stronger, and instead of having two supporting pillars this road will have three. The roadway is to be 44 feet wide, and to be supported by iron girders having a depth of 5½ feet. The new road will extend down Railroad avenue from Brunswick street to the ferry at the foot of Montgomery street, from which points boats run to Cortlandt and Desbrosses streets in New York.

The appointments of Hugh Grant, the Mayor elect of New York, will comprise a President of the Board of Health, a Commissioner of Public Works to succeed General Newton, a Dock Commissioner, a Park Commissioner, and several others of importance.

The Iron Steamboat Company, of New York, received during the last 12 months \$330,121, and have a balance of \$23,094 above their expenditures.

The San Francisco *Daily News* states that the present wheat crop of California will yield 30,000,000 bushels for export, while there were carried over from last year 7,300,000 bushels, making a total surplus for shipment of 37,300,000 bushels.

Colorado has 1,000,000 acres of coal lands within 60 miles of Pueblo with veins from 6 to 9 feet in thickness. The quality is bituminous.

The great national celebration in this city on April 29 and 30 next of the centennial of the inauguration of George Washington will be a notable event, attracting thousands of visitors to New York and taxing all modes of conveyance. Eldridge T. Gerry, Mayor Hewitt and other leaders of the committee in charge of the arrangements have been engaged since last summer devising the details. Gen. James M. Varnum and S. D. Babcock constitute the executive committee; Major Asa Bird Gardner and John J. Pierrepont the Committee on the Army and Navy; Gen. Louis Fitzgerald the Committee on Finance, and Secretary Clarence W. Bowen the Celebration Committee. The celebration will conform as exactly as possible to the procedure gone through with when Washington came to New York for the inauguration. President Harrison will come from Washington with his Cabinet officers, the Chief Justice of the United States and other high officials. A meeting in Wall street, a banquet in the evening and religious services in several of the churches are a part of the programme. There will also be a naval display in the harbor, with accompanying salutes.

The Secretary of the Treasury has instructed the Collector at San Francisco that Chinese merchants are not affected by the Exclusion act, and that those now resident in the United States, who visit foreign countries, may be admitted on their return upon any evidence of identity satisfactory to the Collector.

Dr. David Hostetter, of Pittsburgh, whose pet scheme was the construction of the South Pennsylvania Railroad, died in this city, 5th inst. He held stock in the road worth \$2,000,000. The total amount

of policies on his life is \$361,000. George H. Forster, President of the Board of Aldermen and also President-elect for the term of two years from the 1st of January next, died 8th inst. It is the duty of the present Board of Aldermen to elect a person to fill the vacancy.

Smooth iron steps are made safe during the winter season with a small soft rope woven up and down, to and fro, from top to bottom. The remedy is cheap and effectual.

The Eiffel tower at the Paris exposition is raised to the height of 200 m. It has already cost 3,550,000 francs, and 5,575,000 pounds of iron have been used. All the waste is saved and converted into odds and ends, such as ink bottles, paper weights, &c., to be sold as *souvenirs* at the tower during the exhibit.

The great Navarro Flats, at Fifty-eighth and Fifty-ninth streets and Seventh avenue, which are said to be the largest of their kind in the world, were sold under foreclosure on the Real Estate Exchange, 9th inst., for \$200,000. When the flats were finished the funds ran out, and John J. McComb loaned the company between \$2,000,000 and \$3,000,000, taking a second mortgage on the property as security. The total cost of the buildings was between \$5,000,000 and \$6,000,000. The foreclosure was on a partial mortgage of \$363,000, and Mr. McComb was the only bidder. He bid \$200,000, and at this price he gained control of the huge venture in real estate.

Within a radius of 40 miles of Rochester there are more than 1500 fruit evaporators, giving employment during the autumn and winter to about 30,000 hands. Last season the production of these evaporators was about 30,000,000 pounds, worth at first cost about \$2,000,000. A large proportion of the product is exported.

A coal mine explosion near Pittsburg, Kan., caused the death of no less than 160 men, who were entombed in the workings deeply below the surface.

An electrical fire engine, which can be tapped for service whenever wanted, is the latest invention. The advantages claimed are that it can be started at full speed; that it is much lighter than a steam fire engine of equal power; that it costs one-third less; that it is noiseless in its operation, makes no smoke, sparks nor ashes; that it is safer and easier to control and is economical.

The exhibitors at the National Exposition, in Augusta, Ga., organized an association on Saturday with the following officers: President, J. W. Cook, of the American Supply Company, Providence, R. I.; vice-presidents, S. H. Martin, of Fairbanks Scale Company; Henry O'Brien, of Freeman & Gillies, New York, and Joseph Day, of Augusta; secretary, Thos. P. Henry, of the *Chronicle*. A committee was appointed to formulate plans of procedure, composed of T. W. Carwile, of the Baldwin Fertilizer Company, of Savannah; E. H. Marble, of Curtis & Marble, textile machinery, Worcester, Mass., and E. H. Hickok, of the Pope Mfg. Company, of Philadelphia.

The new home of the New York Club, on Fifth avenue and Thirty-fifth street, is a gorgeous palace costing \$450,000. The architect was A. J. Manning, associated with R. H. Robertson.

The Central Vermont Railroad has just completed at Ticonderoga, on the Addison branch, a new drawbridge. Its draw is 800 feet long, 30 feet wide, with sides 12 feet high, and resembles somewhat in appearance a huge canal boat. It contains 250,000 feet of lumber, while its total weight is 400 tons. When navigation

closes the draw will be towed to "Ti," where it will replace the old draw which has been in use for the past 20 years.

The massive iron girders for the highway across the tracks of the Harlem Railroad, near the lower end of Melrose, were last week placed in position. It is the first of a number of bridges necessitated by the sinking of the roadbed from Mott Haven to Williams Bridge.

Keely, of motor fame, is in contempt of court at Philadelphia, for not obeying the order of the Court as to the exhibition of the Keely motor to the experts appointed by Court. The Court also refused to dissolve the injunction which forbids Mr. Keely dismantling or removing the motor.

The Boston Sugar Refinery closed during the past week, leaving the trust without representation in that city, and the fact is construed as a reaching out for larger profits. Respecting operations in New York, a reporter says the calculation is that the trust firms of Havemeyer & Elder, Matthiessen & Wiechers, the Brooklyn Sugar Refining Company, and Dick & Meyer will supply the New England market from now on. De Castro & Donner, Moller, Sierck & Co., and the North River and the Oxnard Companies, as well as the Havemeyer Sugar Refining Company, have to be supported from profits on the product of the four refineries named, and it is necessary to do a large business with wide margins of profits to secure satisfactory percentages. By another summer the new Greenpoint refinery of the Havemeyer Company, to take the place of the one burned two years ago, will be ready to add its product to that of the others in the trust.

Passengers over the Brooklyn Bridge number more than 3,000,000 a month.

Gen. Roger A. Pryor, counsel for the prosecution in the case of the State Attorney-General against the North River Sugar Refinery Company, to prove an illegal combination, claims to have elicited from reluctant witnesses a great deal of valuable information as to the origin, nature and composition of trusts. He discovered that 18 sugar refineries belonged to the sugar trust which had been incorporated last December under the name of the Sugar Refineries Company, and that the trust represented \$50,000,000 of capital and refines 3,000,000,000 pounds of sugar a year—about two-thirds of all the sugar refined in the United States. The president is Theodore A. Havemeyer, the head of the great Williamsburg sugar refinery, and John E. Searles, Jr., is the secretary.

The utility of bulkheads in steamships was again illustrated in the collision of the Cunard steamship Umbria with the French steamship Iberia during a dense fog off Long Island on Saturday afternoon. The latter was cut clean through, so that 20 feet of the stern dropped off. The only damage sustained by the Umbria was a jagged hole in her bow 5 feet above the water line and about 1 foot from the stem. On the starboard side it showed a ragged outline, while on the port side the steel plates had been punctured and driven outward. The Iberia floated 32 hours after the Umbria struck her. Her watertight compartment kept her afloat until 9 o'clock on Sunday night, when she sank in 80 feet of water while lying at anchor about 4 miles southeast of Long Beach Hotel.

A St. Petersburg dispatch says a powerful American syndicate is about to be formed for the purpose of building railroads in Siberia. Besides a large subsidy the Government will give 4,000,000 rubles yearly for the transportation of mails and convicts.

The Iron Age

New York, Thursday, November 15, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Nine Months' Imports.

A study of the last import statistics published by the Bureau of Statistics throws additional light upon the favorable situation in the steel trade. We noted lately that the falling off in imports is a very important factor—or, in other words, that the falling off in the demand for steel rails was nearly offset by a decline in the imports of raw material. During the first nine months of 1888, the imports of iron ore were only 474,482 tons, against 1,012,352 tons in 1887, a falling off of 537,870 tons. In pig iron the drop was from 377,781 tons to 139,639 tons, the greater part of the latter being manganiferous stock. In steel rails the decline is from 95,622 tons to 53,597 tons, while the imports of steel blooms, billets and slabs fell from 265,102 tons to 79,446 tons, a decline of not less than 185,656 tons. In wire rods the imports fell off from 122,264 tons gross to 82,098 tons. Steel sheets and plates declined from 19,078 tons to 15,432 tons.

Grouping together the four lines in which steel plays an overwhelmingly important part, so far as tonnage is concerned, we have the following:

Imports of Steel—Nine Months.

Gross tons.	1888.	1887	Decline.
Steel rails.....	53,597	95,622	42,025
Steel blooms, &c.....	79,446	265,102	185,656
Wire rods.....	82,098	122,264	40,266
Steel sheets, plates..	15,432	19,078	3,646
Total.....	230,573	502,066	271,593

Such a quantity of steel, say 275,000 gross tons, would represent about 325,000 tons of pig iron. Adding about 175,000 tons less of Bessemer pig imported out of the falling off of 238,142 tons of pig iron, we would reach a total of fully 500,000 tons of this class of raw material. Converting this into iron ore, it would be equal to about 800,000 tons, so that with the falling off in the imports of ore of 537,892 tons we would reach a total of 1,350,000 tons. This would represent the quantity of ore equivalent to our lessened imports. Our decline in the demand for rails was reckoned at 475,000 for the first nine months. Again figuring back to ore, we would have 550,000 tons of pig, or, say, 925,000 tons of ore. It is safe to state, therefore, that the decline in the consumption of rails has been compensated for, so far as the supply of raw materials is concerned, by a lessened importation of foreign stock.

From another standpoint the import statistics show another fact worthy of being attended to. The imports of old iron fell off in the first nine months from 259,454 tons in 1887 to 35,986 tons in 1888, and the receipts of old steel scrap declined from 24,282 tons to 8166 tons. The result has been a narrowing of the supply of old stock, which must have told favorably to

some extent on the demand for muck bar, and therefore for mill pig. The high prices for old rails have had a favorable effect, too, upon the quantity of new rails ordered. The difference between the high market value of the old material and the very low price at which rails are sold is so small that it must be very attractive to railroad managers. Sales of steel rails for 1889 delivery have been made, under exceptional circumstances, it is true, at \$26 at Pittsburgh, while old rails fetch there \$25. Paying freights both ways and even allowing a very good cost for labor and supplies in removal and relaying, railroads can put down steel at a very small outlay in cash.

Freight-Rate Problems.

The last few weeks have developed problems in the several sections of our country whose solution by the railroads must be of importance to all manufacturers and merchants. In the South the Richmond Terminal Company bid fair to acquire such power as will enable them to control the commerce of their territory to a greater or less extent. Already possessing the Richmond and Danville, or Piedmont system, and the East Tennessee, Virginia and Georgia, they bought the control of the roads owned and leased by the Central Railroad of Georgia. The gossips declare further extensions to be probable; the Atlantic Coast roads, the Georgia Pacific, the Norfolk and Western and even the Baltimore and Ohio are mentioned as possible acquisitions. The possible effect of such a centralization of railroad power is a grave subject. It is true that in our day great aggregations of capital seem necessary for the best results, and that often subdivision means waste, but the power for evil increases with the power for good. Even more than in mercantile affairs, trusts or great combinations of capital in transportation are capable of damaging commerce. When pressed, we often can use a substitute for something whose price is arbitrarily advanced, but if we trade at all we must use the railroad. A bad symptom in the present case is the large amount of water which the Richmond Terminal continue to pour into their stock and bonds as their several acquisitions are made one by one. An accurate calculation of this water is very difficult, but enough is known to make certain that the original values have been greatly exceeded. It is not to be supposed that the Terminal Company are philanthropic, rather they are organized to make money. Sooner or later such excessive capitalization will demand earnings, and the danger is that to obtain these earnings the traffic may be forced to pay "all it will bear," and that, too, when measured by a high standard. Forced rates would in various ways be brought down again in time, but meanwhile trade would suffer. It is to be hoped that the turn of events will not subject the South to any such unnatural tariff advances.

The suit of Coxie Bros. against the Lehigh Valley before the Interstate Commerce Commission means a more searching inquiry into an old and standing complaint than we have yet had. The great coal-carrying railroads are practically coal miners also. The law forbidding this is evaded by forming subsidiary companies

for the mining which are owned and controlled by the railroads. The result has always been that the railroads have had things their own way. Private owners of coal lands have in the past been compelled to sell out or have been silenced. In the present suit it is understood that two allegations are made. First, that the Lehigh Valley Railroad makes a lower rate to its own coal company than to the complainants; and, second, that the rates on an thracite are proportionally much higher than on bituminous coal. The first point involves the whole question of the relationship of the coal carrying to the mining companies and, incidentally, the good and bad features of combinations. The second point is a fine one. In England it has long been held that things which have a "competitive interest" in each other must be considered together in rate making. So far as the question has come up in America, the same ground has been taken, the Interstate Commission deciding in the case of a powder which competed with soap that the rates must be approximately alike. Just how far hard and soft coal compete, and just how far the public would use hard coal under certain conditions of price and supply are difficult questions, but ones which our railroads have not hitherto set themselves to answer fairly. The suit opens up the subject for discussion and also the means by which the present condition of things is maintained.

West of the great lakes the passing of the dividends and the losses of the railroads there are well known. It is probable that the exceptional profits of the past six or eight years will not soon be realized again, and those roads which are heavily bonded in aid of extensions not yet self-sustaining must continue to find difficulties in paying good dividends. Just now the center of attraction is the State of Iowa. In reply to a letter from the Railroad Commissioners asking for a valuation upon their road, the Rock Island said that it was not worth as much as it was four years ago and more than it would be four years hence if the State kept up its crusade against carriers. True enough; and yet the Rock Island is trying to pay dividends upon stock which was doubled in 1880 by the free gift of one additional share to each holder of one. Granting that the road was worth double in that year, the difficulty with all watering is that there is no way of registering a corresponding decline in value when such takes place. The doubled stock must stand at double in adversity and earn the doubled dividend if possible. Meanwhile the jobbers of that State are successful before the State Commissioners in their complaint that the tariffs are arranged to give the country trade to Chicago. It is the old question, and apparently as far from solution as ever. Assuming that no city owns any particular trade community by right, we see how difficult it is to arrive at any basis by which such questions can be decided. Shall we attempt to neutralize "push" on the one side or the advantages of neighborhood on the other? What shall we allow in rates to the interior jobber to offset the greater variety of stock in the large cities? To such questions no definite answers can be given, and yet without such information no lasting settlement of the problem is possible.

Jurisdiction of Corporations.

A decision of considerable interest to corporations was made on the 5th inst. in the United States Circuit Court at Chicago. It appears that under a recent Congressional enactment no suit can be brought in any United States Court against a person who is not an inhabitant of the district in which the court is held in cases in which the United States courts have original jurisdiction. As applied to individuals this provision of law doubtless acts and was intended to act as a safeguard against persons being called upon to plead in a suit brought against them probably maliciously in a locality distant from their place of residence. With respect to corporations, however, it operates in a manner hardly contemplated by those who favored its enactment. The specific case decided was that of the La France Fire Engine Company against the Fire Extinguisher Mfg. Company, of New York, whose manufactory, however, is in Chicago. The defendant filed a plea to the jurisdiction, setting up that it was a New York corporation having its office in New York and holding its board meetings in that city, and that, although it did business in Illinois, it was not subject to the jurisdiction of the United States courts there. Judge Blodgett decided that although the fact of a foreign corporation, having a factory and doing business in Illinois, presented a hardship if it could not be sued there, yet it was clear that under the provisions of the act of Congress of March, 1887, amended this year, he could not entertain jurisdiction of the suit. Being a New York corporation, the defendant would have to be sued in New York. Under the wide-spread custom now existing of granting liberal charters to corporations in nearly every State, whether they intend to do business in that State or wholly outside of it, this law, as interpreted, would seem to open the way to great inconvenience.

The Precious Metals in 1888.

Several financial and monetary events have favorably influenced the value of silver or are about to do so this year, and go to explain the rise which has taken place in the London market since May, and its firmness at present. The course of silver so far in 1888 has been as follows, giving the extreme range each month:

Pence.		Pence.	
January.....	44¼ to 44 9-16	June.....	42 to 42 3-16
February.....	44 to 44 5-16	July.....	42 to 42½
March.....	43¾ to 43	August.....	42 to 42½
April.....	42 to 42½	Sept.....	43 to 44 5-16
May.....	42½ to 41¾	October.....	43 to 43¾
November 10.....		43 1-16	

Early in June the Secretary of State for India published in London his prospectus of a 4 per cent. Indian loan of 300 lacs of rupees, equaling in value £2,000,000, for which subscriptions were taken at Calcutta, Bombay and Madras on July 3. This loan improved the exchange on India and the price of silver correspondingly. Simultaneously it was reported from Rio de Janeiro per cable that in consequence of the abolition of slavery in Brazil, by decree of May 13, some \$16,000,000 worth of paper money were to be withdrawn and replaced by silver coin, to enable the planters to pay freedmen's wages in specie, and that the said amount would have to be bought in the open market.

Toward the close of September it was announced from St. Petersburg that in order to transform the monetary basis of Russia, and be able to coin 400,000,000 rubles of fractional silver, the Government would have to buy in the open market 3,250,000 kg. of fine silver, equaling in value \$105,000,000 American. The moment for a partial return to specie payment seems to be a propitious one in Russia. Gold is pouring into the country for grain, and the Ural Government gold mines produce abundantly. Besides, in consequence of the momentarily peaceful outlook, Russian securities have commenced to improve in value rapidly. The mint is at the same time to turn out 211,000,000 rubles of gold, equaling in value \$170,000,000 American, and the amounts of paper rubles to be withdrawn from circulation and destroyed would be 97,000,000 rubles of 1-ruble, 139,000,000 rubles of 3-ruble and 145,000,000 rubles of 5-ruble notes, together 381,000,000 rubles, leaving 600,000,000 rubles in circulation, against which a reserve of 300,000,000 rubles in gold, specie or bullion, is to be held in the treasury. This is the plan, virtually restoring specie payment, as the 600,000,000 rubles, with a 50 per cent. gold reserve, would, of course, command par.

At the same time the Argentine Republic attracts a great deal of gold in consequence of the many national, provincial, municipal, railroad and other loans that have been floated in Europe so far this year, the end of which is not yet. Of course a goodly portion will be returning continually to pay interest in Europe on the enormous indebtedness the Argentines have been and are contracting. As London bankers have found that there is some profit in making gold shipments from New York to Buenos Ayres direct, instead of via London, a commencement was made last month, and \$500,000 in American eagles were shipped.

Silver shipments from London to India, China and the Straits from January 1 to October 18 have been as follows:

	1888.	1887.
To India.....	£3,425,852	£2,987,550
China.....	284,729	247,716
the Straits.....	404,780	475,570
Total.....	£4,115,361	£3,710,836
From Marseilles...	233,197	650,009
Totals.....	£4,348,558	£4,360,845

An increased output of gold is expected in 1888 in California, British Columbia, Brazil, Mexico, Venezuela, the Argentine Republic, Victoria, New South Wales, Queensland, Southern India and South Africa. The latter exported £69,543 in 1885; £133,534 in 1886 and £235,937 in 1887. During the first six months of 1888 it was £390,000. Later cables estimate this year's South African production at £1,000,000. The estimate of the world's gold production in 1888 is £21,000,000, which would slightly exceed even the large 1885 output, which proved to be £20,720,000. Consequently plenty of gold is likely to be produced as an offset against the growing demand for it alluded to. As for silver, we presume the United States production will be at least equal to the average of the last three years, which was \$52,000,000; in Mexico an increase may be looked for, and a decrease in Bolivia should the revolution there not be quelled soon. At any rate, both metals seem to be in good position.

The Ventilation of Petroleum Ships.

With the advent of the petroleum tank steamer the danger involved in the carrying of petroleum cargoes was, for a time, again made a topic of absorbing interest. The tank design, as compared with the old method of transporting the oil in barrels, suggested new risks, which, though at first receiving little attention, have, in the light of recent experience, grown considerably in importance. It was not so much the danger of fire, which is present both when carrying the oil in tanks and in barrels, but that of explosion of the gases in empty or partially filled tanks concerning which apprehension was felt, and with what good cause has been shown by the disastrous explosion a few weeks ago of the steamer Ville de Calais, at Calais, France. The amount of available energy in the mixture of petroleum vapors and air in a ship's hold under ordinary conditions has probably never even been guessed at. The Calais accident is, therefore, all the more instructive and suggestive of the fearful consequences which a slight neglect of precautionary measures may bring about.

The explosion was specially remarkable for its violence, of which a striking illustration is given in an account furnished to the *London Standard*. Briefly stated, the circumstances connected with the explosion appear to have been these: The vessel had discharged her cargo of petroleum, and to take its place and serve as ballast water was being pumped in. While this was going on one of the engineers entered the hold with a naked light, which at once communicated with the gas present. The effects of the explosion were visible in every part of the town. Windows were smashed in all directions, and the concussion was so great that people, believing an earthquake had occurred, left their houses in terror. The wreck of the steamer itself presented a remarkable appearance. The after-part of the vessel remained almost intact. The rest, with the exception of a small part of the fore-castle, had been blown into the air and scattered in all directions. The force of the explosion was so great that huge pieces of machinery were hoisted up in an extraordinary manner, and large pieces of iron plating were blown to almost incredible distances. In some houses, ¼ mile from the scene of the accident, the shock was so great that people were thrown down in their rooms.

The explosion is not the only one which has marked the introduction of the petroleum cargo steamer, and only emphasizes the requirements which have already been shown to exist for safer means of working such ships. In every instance thus far the explosions were brought about by the introduction of naked lights into an atmosphere charged with gases, or rather petroleum vapors in about the proportion necessary to form explosive mixtures, and the problem of insuring safety therefore presents no unusual difficulties. It is not necessary that petroleum steamers be given isolated anchorages for discharging their cargoes and taking in ballast or undergoing repairs, so as to protect what would otherwise be their surroundings; nor is it practicable, on having discharged the oil, to fill the tanks with water, as has been suggested, so as to prevent the formation of explosive mixtures, since by this method

all facilities for internal inspection and repairs would be cut off. Efficient ventilation, however, would fully secure the desired end and as a means of insuring safety is both the simplest and most satisfactory generally. With a good circulation of air there would be no time for dangerous mixtures to form, and absolute immunity from explosions would be assured. The cost of the necessary ventilating plant, moreover, would not be large, and ought not to weigh heavily against the adoption of a thoroughly well designed system. The latter, in fact, should be made compulsory. The amount of air to be supplied and the means of distributing it in every part of a vessel's hold are the points which should receive close attention. At present, so far as we know, with few exceptions only the crudest kind of ventilation is attempted, in which wind sails and open hatches play important parts. The insufficiency of such systems is beyond all doubt, and these should be condemned without waiting for further disastrous demonstrations.

Chimneys for Boiler Plants.

The 335-foot chimney of the Clark Thread Company, at Newark, N. J., which, of late, has been very widely noticed, being probably the tallest boiler chimney in the world, calls to mind the fact that a large number of chimneys now in existence are of much greater height than the requirements actually call for. There seems to be a prevailing notion that the greater the height the greater, in direct proportion, the draft-producing power of a chimney—a most natural error perhaps on the part of the average power men, but, at the same time, one which has been responsible for much unnecessary outlay in chimney construction. As a matter of fact the draft-producing capacities of chimneys, having flues of the same size, are in proportion to the square roots of their heights, so that if one was to have double the power of the other it would have to be four times as high. Attention has been more than once directed to the circumstance that beauty of design, from an architectural point of view, has had much to do with the unnecessarily great heights so frequently encountered, a much favored rule being to make the height of the chimney equal to about 25 times the diameter of the flue. A little consideration will show that by rigidly adhering to this ratio some rather peculiar results will be reached, chimneys for small plants turning out to be much lower, and those for larger boiler plants becoming much higher than is necessary. The area of cross section of the chimney flues in all cases should be made to depend upon the combined areas of the boiler flues, and this, with a height of stack of 100 feet, shown by extended experience to be a very satisfactory figure, will furnish ample draft to burn any of the commonly used fuels. Applying the 25 to 1 ratio to two plants of, say two and ten boilers, respectively, all of the same size, and proportioning the flue areas of the chimneys in the way we have just indicated, will afford a very striking illustration of the shortcomings of the rule. One hundred and fifty feet represent what has on good authority been given as the maximum height of chimney necessary in

any case for producing the requisite draft, always providing, however, that the flue area has been properly proportioned. Proprietors of steam plants boasting of chimneys which must exceed this figure in height may indulge in some profitable reflections as to the money needlessly spent in having such structures raised.

The sudden declaration of hostilities among the trunk lines is a matter likely to seriously influence the general business situation, which has been steadily tending in the direction of improvement. Looking back upon the record of 1888, it seems amazing that the business community has been able to resist so easily shock after shock. Again and again we have suffered from setbacks, and yet, on the whole, prosperity has increased. It seems almost impossible to resist the conclusion that, at no distant date, the impetus we have been gathering must sweep aside all minor obstacles. Our farmers, on the whole, have been blessed with good crops, and are getting good prices. Our railroads are carrying an enormous tonnage, taxing their capacity. Our manufacturers have been crowded with work. Consumption has been liberal, the financial situation is without any signs of immediate danger. Commercial disasters are not unduly numerous nor indicative of widespread rottenness, and labor is generally content and quiet. Producers and traders generally are doing quite well, although many complain of narrow margins. In spite of all these facts, unfavorable news crops up with amazing frequency. The last, the trunk line war, presents the spectacle of two great interests cutting into one another's revenue, when, confessedly, one at least has as much business as it can handle possibly with its equipment. Under the circumstances, it would seem likely that so disastrous a policy could not long continue. If it does the indirect influence upon the business interests of the country cannot help being unfavorable and stay the rising tide of prosperity.

A curious plea made in behalf of the American Bell Telephone Company, in the litigation over the patent, has just been brushed aside by the United States Supreme Court. On the ground that the Bell telephone patent had been fraudulently secured, the officers of the Government entered suit to have it declared void. The suit was first dismissed in Ohio, on the decision that the court that it had no jurisdiction. It was carried before the United States Circuit Court, at Boston, and there the demurrer of the Bell company was sustained. On appeal to the Supreme Court this latter decision is now overruled, and the question can now be argued on its merits. This preliminary skirmishing has, however, settled one interesting point which should be noted by manufacturers and inventors. The Bell company claimed that the United States had no right, in the absence of a specific statute granting that power, to bring a suit to cancel a patent, and that such a suit could only be brought by a private party and not by the Government. In other words, a privilege once secured, even fraudulently, from the Government, cannot be recovered by it by process of law, a right never denied an individual. The directness and force with

which this claim is characterized as contrary to all ideas of justice is a severe rebuke to the lower court and puts at rest the claim that there is no remedy against fraud once successfully practiced when a patent for an invention is at stake and the Government itself seeks to break a monopoly.

OBITUARY.

WILLIAM DEAN, SR.

William Dean, Sr., one of the best known and highly respected citizens of Mingo Junction, Ohio, died at his home in that place, on Monday, the 5th inst., aged 63 years. For the past ten years Mr. Dean's health had been slowly failing, and on the Sunday evening preceeding his death he was stricken with an acute pain in the stomach, which increased until death relieved his sufferings. Mr. Dean was a native of England, where he was born on October 2, 1825, but came to this country at an early age and settled in Phoenixville, Pa., where, for a time, he worked at his trade as a stone-mason. While living at that place he married Isabella Griffin, a native of New York City. About 1850 he left Phoenixville and came to Wheeling, W. Va., where he soon became associated with David Spaulding, C. B. Doty, S. H. Woodward, John McClinton and W. H. Wallace, and joined with them in the formation of the La Belle Iron Works, and afterward became identified with the Jefferson Iron Works, of Steubenville, Ohio. He was actively connected with the iron business, and with Andrew Glass formed the Mingo Iron Works, about 16 years ago. Mr. Glass was president, and Mr. Dean vice-president, and his son, Geo. A. Dean, subsequently became secretary. About the time of the starting of the Mingo Works he removed to Mingo, where he resided until his death. The Mingo Iron Works failed about 1877, since which time he has not been actively engaged in any business, although maintaining his keen and intelligent interest in the progress of Mingo. He took the failure of the old works very much to heart, and his failing health dates from that time. Mr. Geo. A. Dean, the secretary and superintendent of the Junction Iron Company, of Mingo Junction, Ohio, is a son of the deceased.

DAVID HOSTETTER.

Dr. David Hostetter, one of the best known and wealthiest citizens of Pittsburgh, died in this city on Monday, the 5th inst. He was here for the purpose of being treated for kidney trouble, and underwent a surgical operation, which resulted in his death. Dr. Hostetter was connected with a number of enterprises in Pittsburgh, being a large stockholder in several natural gas companies, and was also a heavy stockholder in the proposed South Penn Railroad. His funeral took place from his residence in Allegheny City, on Friday, the 9th inst.

FREDERIC A. POTTS.

Frederic A. Potts, the head of the coal firm of Frederic A. Potts & Co., and one of the most prominent men in the coal trade in the country, died on Friday night, at his residence, 39 East Thirty-ninth street. He had been sick only two weeks with cancer of the stomach. Mr. Potts was born 52 years ago, in Pottsville, Pa., and was the son of George H. Potts, late president of the National Park Bank. He was educated in Pottsville, and when about 20 years of age he became a salesman for Auden Reid & Co., of this city. In 1866 he became a member of the firm, and on the death of Mr. Reid, in 1874, succeeded

to the business, which he conducted alone until 1883, when the firm of F. A. Potts & Co. was formed. Mr. Potts was well-known in the coal trade and in railroad circles. He was president of the Coal Exchange, vice-president of the Park Bank, president of the New York and Susquehanna Railroad, a director in the Mutual Benefit Life Insurance Company, of Newark, N. J., and also held other offices of importance. He was once the Republican candidate for Governor of New Jersey, and was widely known in that State, as well as in this city. He leaves a widow, two daughters and three sons.

The Charcoal Furnaces November 1.

As will be observed from the details printed below an increase has taken place in the current output of charcoal iron, the principal improvement having taken place in Michigan.

Charcoal Furnaces in Blast November 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	8	605	6	495
New York.....	10	4	511	6	480
Pennsylvania.....	23	5	450	18	624
Maryland.....	8	3	282	5	300
Virginia.....	23	6	281	17	710
West Virginia.....	3	0	0	3	185
Ohio.....	18	7	482	11	773
Kentucky.....	2	2	208	0	0
North Carolina.....	2	1	90	1	80
Tennessee.....	9	6	1,399	3	740
Georgia.....	2	0	0	2	114
Alabama.....	10	7	1,442	3	480
Michigan.....	25	14	4,083	11	2,480
Minnesota.....	1	0	0	1	190
Missouri.....	4	2	611	2	320
Wisconsin.....	10	4	1,435	6	810
Texas.....	2	2	305	0	0
California.....	1	0	0	1	220
Washington Ter.....	1	1	270	0	0
Oregon.....	1	1	390	0	0
Total Nov. 1.....	169	73	12,724	96	8,941
Total Oct. 1.....	175	71	11,619	104	9,083
Total Sept. 1.....	178	67	11,243	109	10,004
Total Aug. 1.....	176	65	11,137	111	10,085

In New York Copake resumed on the 19th ult., and Millerton was banked for three weeks for repairs. In Maryland two Stickney and one Maryland furnace are running, while no changes have taken place in Virginia. In Kentucky both Bellefonte and Hunnewell continue at work, while in Ohio, Bloom went out of blast in October. In Michigan Detroit and Elk Rapids again began to make iron, the total product of the State being estimated at 17,814 tons in October, against 16,171 tons in November. In Wisconsin, the capacity has been reduced by the destruction by fire of the Appleton furnace, which will not be rebuilt before next year. This leaves Hinkle, Fond du Lac, Minneapolis and National as the producers, their combined output in October having been 6166 tons. In Missouri Midland and Sligo are running. In Tennessee the one Nashville furnace is running on coke. The second new furnace will probably make its first cast of charcoal pig early in December. In Alabama Round Mountain furnace was banked at the time reported on account of labor troubles. In Texas the Old Alcalde furnace is making good yield, while on the Pacific Coast Oswego in Oregon and Irondale in Washington Territory are running. The former, a new stack, was blown in on the 30th ult., and is making 50 tons a day.

The Charcoal Iron Workers.—The death of Mr. Samuel Noble, the president of the United States Association of Charcoal Iron Workers, has led to the abandonment of the proposed meeting at Anniston, Ala. A meeting will be held at the Oriental Hotel, Thirty-ninth street and Broadway, New York, commencing

Wednesday, December 5th. The International Navigation Company have tendered a complimentary luncheon on board one of their ocean steamers, and Thursday is to be spent at the laboratory of T. A. Edison, at Llewellyn Park, Orange, N. J.

Washington News.

(From Our Regular Correspondent.)
WASHINGTON, D. C., November 13, 1888.

The results of the election of last Tuesday for the executive and legislative branches of the Government put an entirely new phase on the tariff question. It is no longer an issue before the people, but a problem to be solved in accordance with their verdict. Had the elections resulted in a Republican President and Senate with an opposition House, the industries of the country might have been subjected to another long period of agitation and doubt. With every branch of the Government in the hands of the Republicans, it is a guarantee that whatever may be done in revising the tariff and reducing the surplus, it will be in accordance with the policy of protection to home industries. There will be no partisan antagonisms, but the work will be done in a spirit of harmony. Whether it be done promptly through the avenue of an extra session called to assemble immediately after the inauguration of the new President, or whether it be delayed until the time of meeting of the regular session nine months after, the industries of the country can go ahead with the confident knowledge that whatever is done, and whenever it is done, it will not be with the disturbing tendencies of antagonism to established and long-tried doctrines. The prospective President, whatever might be his personal views as to the details of tariff revision, is thoroughly in line with his party on the general theory, and, therefore, will not antagonize any measure which may emanate from the majority in Congress.

The organization of the House in the election of Speaker will be diametrically opposed to the impulse which led to the selection of Mr. Carlisle for the chair of the present body. It is more than probable the choice will fall upon either Reed, of Maine, or McKinley, of Ohio, both of whom are members of the Republican branch of the present Committee on Ways and Means, and whose views on tariff are well known. There is a disposition on the part of the Republican leaders to retire Judge Kelley, who has had a monopoly of the chairmanship of the Committee on Ways and Means, of late years, whenever the wheel of political fortune has turned up a Republican majority in the House. He is at present the senior member of the Republican wing of the present committee, but he is so more on account of length of service and public notoriety as an ultra-protectionist than from any really superior knowledge of the subject in all its diversified bearings as to details. If the selection should be made by the line of numerical succession, Col. Tom Browne, of Indiana, would come next, but, as he never pretended to be a tariff expert, he would doubtless be very well satisfied to take some important chairmanship in the next House, of which he will be a member. This will then leave Reed and McKinley in that order on the list. The former having the prestige of the vote of his party when it was an empty compliment, his friends will now push him when it means success. His elevation to the chair would open the way to Colonel McKinley to reach the chairmanship of the committee.

It is very generally proposed by Republican Senators who have arrived here to go ahead with the Senate Tariff bill and pass it, sending it over to the House to be dis-

posed of as the majority there may think best, but without any aggressive action on the part of the Republicans in the direction of passing it, thus placing upon the Democratic majority before the control passes out of their hands the responsibility of non-action. This they claim will then give the Republicans a clear field in the next House.

It is now, of course, established that the whole responsibility for economic legislation for the next two years at least will rest upon the Republicans. It may now be settled in the public mind that so far as the reduction of the surplus, if any, shall be involved the repeal of the internal taxes, except upon whisky, which may be modified, will contribute with sugar, the bulk if not the entire reduction. The changes in the Customs schedules will therefore be more with reference to adjustment and equalization than interference with existing rates. It may be regarded also as settled in cases where necessary to the interests of any branch of industry that the rates will be raised.

TREASURY DECISIONS.

The following decisions have been rendered by the Secretary of the Treasury :

Diminutive knives which are intended for use as "charms" for watch-chains, and are incapable for use as pocket-knives or for any useful purpose whatever, are held to be dutiable at the rate of 25 per cent. ad valorem, for "jewelry of all kinds."

So-called pocket-books or cases containing needles of different designs and varieties are held to be dutiable at the rate of 25 per cent. ad valorem, for "needles, sewing, darning, knitting, and all others not specially enumerated or provided for," it being ascertained that the so-called pocket-books or cases are simply the usual coverings of such merchandise.

Pocket-knife blades fully finished and ready for hafting, and which upon investigation were found to be commercially known and designated as cutlery, are held to be dutiable at the rate of 35 per cent. ad valorem for "cutlery."

There is trouble in Corea. Owen N. Denny, formerly United States Consul-General at Shanghai, but of late royal adviser of the King of Corea, has rendered himself obnoxious to the Viceroy of China, Li Hung Chang, who demands his dismissal. The State Department authorities, however, do not believe Li Hung Chang will request the United States to interfere in this matter, but regard the demand referred to as simply an order to the King of Corea to dismiss the American from his official position. Mr. Denny is charged with offensive meddling with Chinese politics, also with having used his position to ingratiate himself with the Russian Government, for whom he has secured an important trading concession along the northern frontier of Corea. The relations sustained by Mr. Denny to the King of Corea seem to have closely resembled those so long held by Mr. Gibson to the Hawaiian King, but from which he was summarily removed by a popular uprising. Americans are not always successful in the rôle of aids to foreign potentates. In the case of Mr. Denny, he may be regarded as the first victim of Chinese retaliation.

The completion of the great 36-inch gas main in Pittsburgh is an occasion for rejoicing. The job is called the largest of its kind known. The line is formed of 22,700 feet of cast-iron pipe and 400 feet of wrought-iron pipe. The inside diameter of the pipe is 36 inches. The cast-iron pipe weighs 485 pounds to the foot, and 1½ inches in thickness. The wrought-iron pipe is ¾ inch in thickness, and weighs 190 pounds to the foot. The cast-

iron pipe has lead and asphaltum joints, with double escapes. The wrought-iron pipe has an asbestos flange joint. They are all calked from the inside of the pipe, so that the pressure of the gas will only serve to make the joint tighter, instead of weakening it. The pipe, when tested at the works, stood 300 pounds pressure, and an 80-pound pressure when laid.

American Tin Plates.

During the past week an interview has been widely quoted with W. C. Cronemeyer, chairman of the United States Iron and Tin Plate Company, Limited, of Demmler Station, Pa., granted to a reporter of the *Pittsburgh Dispatch*. In one important particular Mr. Cronemeyer's statement was incorrectly repeated, hinging as it does on the introduction of the small word "if." We reproduce the interview with the preface that American tin plates are to reappear in our markets "if the Senate bill is passed, amended so as to bring tin and terne plates under the same clause with galvanized iron."

This means the shutting out of foreign tin plates, the renewal of the industry in this country, and the employment of 100,000 men who are now idle. Within six weeks after the time the Senate bill is passed we will begin the manufacture of tin plates, and will make additions to our works filling the 5 acres of vacant ground, and inside of two years we will have 1000 men in our employ, instead of 200. Of course we will have to import block tin for a few years, as there is not a developed tin mine in this country. There are large quantities of tin in Virginia and other parts of the country, and mines will be developed as soon as there are assurances that there will be a protective tariff on the tin-plate industry. The American Tin Plate Association has not held a meeting or done any business for a year or two, but it is likely they will meet in a short time. When I say that 100,000 additional men will be employed I do not mean in the tin-plate industry. Only 30,000 skilled workmen will be needed to make the tin plates necessary for the consumption of this country. The other 70,000 will be employed in the manufacture of lead, boxes and other articles necessary.

High-Pressure Boiler Joints.—Mr. F. W. Dean, in a recent communication on locomotive boiler explosions, remarks: "Many of the boilers (especially the high-pressure boilers) of to-day have their longitudinal joints formed by a lap and an inside bent covering plate. This is one of the worst examples of unmechanical construction to be commonly found in engineering practice. It has been my good fortune to test this form of joint experimentally on a large scale in the Watertown testing machine, and it behaved very badly. After the lapped part of the joint was utterly ruined the bent welt proceeded to straighten out, and finally sheared off its rivets, reminding one of locking the stable door after the horse is stolen. It will always behave in this way, and is, therefore, a death trap. The strength percentage of this joint is very low, in spite of the fact that some tests of such joints have shown, when made under exceptional conditions, a high percentage. Nobody would think of making a bent tension member if he could avoid it anywhere else than in a boiler."

A. H. King has leased for a term of years the extensive grounds and shops of the Pennsylvania Railroad Company, at Bordentown, N. J., and has remodeled the buildings to suit the requirements of a railroad equipment depot, where a stock of second-hand cars and locomotives will be kept. The New York office is at 11 Wall street.

The population of Alaska is 49,850, of whom 6500 are whites.

MANUFACTURING.

Iron and Steel.

Charlotte Furnace, of the Charlotte Iron Works, Rochester, N. Y., blew in on the 8th inst., after an idleness of five months. A large number of orders are already in hand.

The Missouri Valley Bridge and Iron Works, of Leavenworth, Kan., manufacture all classes of iron and steel bridges, roofs and other structural iron and steel work. They employ from 100 to 150 hands in their shops and yards and an equal number in erecting when fully employed. They have found work somewhat scarce the past summer, but were very busy the previous two to three years. Contracts now on hand to be completed this year aggregate \$120,000, being the residue of orders taken in 1887. Their usual volume of business is from \$500,000 to \$600,000, but this year will not reach more than half as much. The buildings and yards belonging to these works occupy about 5 acres, but as their accommodations are somewhat cramped the proprietors contemplate the erection of buildings where they will have more room. Their machinery is of the latest and most improved pattern. Their iron and steel are obtained in Pittsburgh, Philadelphia and Trenton.

We are advised that No. 1 furnace of the Stewart Iron Company, Limited, at Sharon, Pa., which has recently been relined and repaired, has not yet resumed operations, and the date of its resumption is uncertain. The reason of this is the inability of the railroad companies to furnish the necessary coke transportation.

For some weeks past a bitter conflict has been going on between Dilworth, Porter & Co., proprietors of the Glendon Rolling Mill, at Pittsburgh, and the Amalgamated Association of Iron and Steel Workers. The trouble dates back to the time of the lockout in July last, when the firm refused to sign the Amalgamated scale, and have since firmly adhered to that determination. No attempts were made by the firm to operate their works until about a month ago, when announcement was made that all the employees who wished to return to work could do so, but not as members of the Amalgamated Association, as the firm proposed in the future to employ only non-union men, but would pay as high wages as are called for by the scale of that organization. The old workmen refused to return to work under these conditions, and the firm have since been engaged in importing workmen from different parts of the country, and have succeeded in obtaining a sufficient number of men to operate the greater part of their establishment, and in a short time expect to have their entire plant in full operation. The firm manufactures railroad and marine spikes exclusively, and have a capacity of turning out 30,000 net tons per year when the works are fully employed.

The report that the Ohio-Valley Foundry Company, of Bellaire, Ohio, whose foundry was completely destroyed by fire some weeks since, had decided to rebuild without foundation. As yet no arrangements have been made to rebuild the plant.

Phillips & Davies have just completed the erection of a plant at Wampum, Pa., and will engage exclusively in the manufacture of railroad spikes. The works are already in operation, and the firm reports a large number of orders on hand.

McKee, Fuller & Co., proprietors of the Lehigh Car-Wheel and Axle Works, at Catasauqua, Pa., are building a temporary erecting shop, 50 x 132 feet, to be used during the winter, as the one the firm have been using is not suitable for cold weather.

The various works of this firm are being operated to their full capacity, with plenty of orders on hand.

On Thursday, the 1st inst., the forge and machine shops of the Columbus Bridge Company, at Columbus, Ohio, were destroyed by fire. The company will continue in the bridge business, and expect to have the burned buildings rebuilt within 90 days. They have already contracted for completion of contracts on hand.

All the puddling furnaces of the Etna Iron Works, Limited, at New Castle, Pa., together with the rolling mill, are now in operation. The guide mill is working double turn. The nail factory has been changed into a pipe mill.

No. 1 Furnace of the Isabella Furnace Company, at Etna, Pa., for the four weeks ending on October 27, produced 6702 tons of No. 1 foundry iron, or an average of 1675 tons per week. This is the largest output in the same length of time in the history of the furnace.

The McAuley Cyclone Pulverizer heating appliance is working most successfully at the rolling mill of the Warren Rolling Mill Company, at Warren, Ohio. In one day recently No. 1 Furnace produced 4300 pounds of iron with 1360 pounds of coal dust, while on the same day No. 2 Furnace turned out 4400 pounds of iron, using only 1840 pounds of fuel. This is regarded as extraordinary, when it is considered that 1½ tons of coal is necessary to produce a ton of iron by the old process. The device is to be experimented with in heating a battery of boilers.

During the month of October, just closed, the steel department of the Bellaire Nail Works, of Bellaire, Ohio, produced 6779 tons of steel, while the blast furnace turned out 4033 gross tons of Bessemer pig iron.

D. W. C. Carroll & Co., Limited, proprietors of the Fort Pitt Boiler Works, at Pittsburgh, have contracted to furnish the St. Paul and Northwest Railroad with 60 iron station water tanks of 450 barrels each. The contract amounts to nearly \$40,000.

Frederick Prime has been made president of the Clifton Iron Company, owning and operating the furnaces at Jenifer and Ironaton, Ala.

The Richmond Standard Spike Works, a new concern recently established at Richmond, Va., have contracted with M. V. Smith of Pittsburgh for the construction of a small rolling mill, spike machines and a regenerative gas furnace, with a capacity for melting 40 tons of steel per day. The firm will make all the iron used in the manufacture of their spikes. Work on the contract has already been commenced.

No. 2 Furnace, of the Spearman Iron Company, at Sharpsville, Pa., was blown out on Wednesday, the 31st ult., for the purpose of being relined and repaired. No. 1 Furnace of this company was blown in on Wednesday, the 7th inst. after undergoing extensive repairs.

Under date of the 9th inst. the Tyrone Iron Company, of Tyrone, Pa., write us as follows: "We shut down our entire plant on Saturday morning, November 3rd, 1888, for the purpose of rebuilding two regenerative gas furnaces. We are also putting up a new building, 60 x 35 feet, over the gas producers and building an entire new wing to our dam, 120 feet long.

Fred Sloss, of Birmingham, Ala., has purchased the Baxter Stove Works, and will build at once a 60-ton furnace. He already has a rolling mill, and will build another for making structural iron. He

intends that these mills with his stove works shall consume the product of his furnaces.

The large No. 2 Keystone furnace of the E. & G. Brooke Iron Company, at Birdsboro, Pa., which has been idle since last January, went into operation on the 12th inst.

Carnegie, Phipps & Co., Limited, of Pittsburgh, have purchased a lot adjoining their Twenty-ninth street mill, between Twenty-seventh and Twenty-eighth streets, and will use it for a bumper-shop. The present bumper-shop department connected with the rolling mill will be removed and in its place 20 double puddling furnaces will be built, making it equal to 40 single, or the whole mill to 82 furnaces. The finishing capacity is nearly 200 tons per day, but at present the facility for making raw material is less than 100 tons.

The managers of the Spearman Douglass and Mabel and Claire Furnaces, in the Shenango Valley, Pa., have raised the wages of their employees 15 cents per day. The prospects are that all the furnaces will be in blast all winter. The Henderson Furnace will resume next week after a long idleness.

The new blast furnace at Oswego, Ore., made its first cast October 21, and on the fourth day after turned out 50 tons of No. 1 foundry pig iron on 82 hours' run. It is owned by the Oregon Iron and Steel Company, was built by E. C. Darley, of Pittsburgh, who has a contract from the company to make iron for a year. The size of furnace is 13 x 60 feet. It has three Siemens, Cowper, Cochrane hot-blast stoves, 15 x 70, being the only charcoal furnace in the United States with three stoves. The Weimer engine has a 42 x 48 inch steam cylinder, and a 48 x 84 inch blowing cylinder. The two batteries of boilers were built by J. P. Witherow. The furnace has a Crane hoist, a Gates crusher, and 36 charcoal kilns. It is claimed by experts who examined it to be the most complete charcoal furnace plant in the United States. The company also have a pipe foundry in successful operation.

The Merion Iron Company, at Conshohocken, Pa., will blow in one furnace at an early date.

The Scranton Steel Company, of Scranton, Pa., on November 12, made 464 tons of ingots in 73 heats in 12 hours, rolling 428 tons of rails in the same time.

Machinery.

The Link-Belt Machinery Company, of Chicago, have begun the erection of their new foundry to be located on their 54-acre tract at Thirty-ninth street and Stewart avenue, Chicago. The structure will be 286 feet long by 87 feet wide, and will probably be completed before spring.

The Cookson Iron Works Company, of Kansas City, Mo., are manufacturers of steam and hydraulic elevators, and dealers in steam engines, boilers, pumps, &c. They are just completing new works, to which they will remove as soon as the buildings are ready for occupancy. They have recently had a great deal of work in cable fittings. A new safety arm for elevators, patented by Manager C. L. Cookson, is being brought out by this company.

The Great Western Mfg. Company, of Leavenworth, Kan., are manufacturers of steam engines, steam pumps and mill supplies generally, their specialty being the equipment of flour mills. They have enjoyed an unusually good run of orders during the past summer and fall for their special machinery for grinding flour. Through the improvements now being made in this class of machinery a reduced

number of break rolls is now being used, the proportion being three or four pairs, instead of five to six. The works of this company were established in 1858, but the present company were incorporated February 1, 1886. They have issued a very handsome catalogue of 188 pages, illustrating and describing their specialties and containing full price lists.

John Seaton, of Atchison, Kan., is building up an extensive and diversified business. He employs about 130 men in the several departments of his works, making automatic grain scales, architectural work, shafting and pulleys, and doing general jobbing. In addition, he makes a line of cannon stoves especially adapted to the use of railroads.

The Union Pacific Railway Company have just purchased 50 locomotives, dividing the order between the Schenectady and the Rhode Island Companies.

The Kansas City Elevator Mfg. Company, 1601 and 1603 Main street, Kansas City, Mo., manufacture a full line of hydraulic, steam and hand elevators for passenger and freight use. Their worm-power elevator is made with tools specially designed by the company, the various parts being made to a standard. The worm-wheel is accurately milled to the proper size and form needed to work correctly with the worm, which is threaded in a lathe. They are not put into use in the condition in which they came from the foundry. To take the end thrust of the worm shaft, a special steel pin and hardened steel buttons are provided, which run in a separate oil chamber, greatly reducing the friction. The safety brake is adjusted by a set-screw and lock nut. Each machine has an automatic stop. Their hand elevators are furnished with Turner's improved patent anti-friction boxes, the invention of A. Turner, manager. This box consists of a combination of six brass rollers with a steel shaft through each, with sufficient play to reduce the friction, thus making the elevators work with ease. The company have issued a catalogue illustrating and describing their system of building elevators.

James Clarke & Co. are operating a well-appointed factory at 1049 and 1051 St. Louis Avenue, Kansas City, Mo., under the name of Kansas City Brass Foundry and Electroplating Works, making anti-friction and babbitt metals, car bearings, locomotive work, &c. They make a specialty of headlight and car work.

Although mainly confined to local work, the Industrial Iron Works, of Kansas City, Mo., are steadily improving in business and growing in importance. They consist of a foundry and machine shop, making railroad, building and machinery castings and taking contracts for machinery for flour mills, coal mines, cable roads and elevators. J. H. & C. A. Burton are proprietors, and the establishment is located at 1212 and 1214 West Eighth street.

Snell & Meharg, manufacturers of vertical engines, at Reading, Pa., report that their works are in full operation, with plenty of orders on hand. Staver & Walker, of Portland, Ore., are the agents of this firm for the Pacific Coast, and are making large sales for the firm in that territory.

The Hill Friction Clutch Pulley Company, of Cleveland, Ohio, are increasing the capacity of their works considerably by the introduction of new machinery.

The Wilson-Snyder Mfg. Company, of Pittsburgh, manufacturers of pumping machinery, have purchased the old Siemens-Anderson Steel Works property on Ross street, in that city, the consideration being \$85,000. The purchasers have already commenced the erection of a new plant on

the ground, the foundation being about completed and the brickwork commenced. It is the intention to erect three new buildings. The main building, fronting on Ross street, is to be of brick, 160 x 50 feet, and three stories in height. It will be used as a warehouse, pattern shops and drawing-rooms, and will also contain the offices. A wing, also of brick, 60 x 60 feet, two stories in height and facing on Water street, will contain the pipe-fitting shop, brass foundry and brass-fitting shop. Running from the rear end of the Ross street building to the Panhandle road a brick building, 200 x 80 feet, and 45 feet in height, will be built. This is to be used in the manufacture of direct acting and duplex steam pumps for all purposes. It will be equipped with a large traveling crane and the latest improved machinery. These buildings are expected to be under roof by January 1, and be ready for occupancy by March. About 800 men will be employed in the new works. The firm also contemplates the erection of an iron foundry on the same lot in about a year.

The Harrison Machine Company, of Belleville, Ill., have elected the following officers for the ensuing year: President, W. C. Buchanan; vice-president, Lee Harrison; treasurer, Cyrus Thompson; secretary, Hugh W. Harrison.

William Fisher, proprietor of the Fisher Foundry, Engine and Machine Works, at Pittsburgh, has received the contract for the 10-inch mill, and the finishing shears to be erected at the new plant of the Minnesota Car Company, at Duluth, Minn., while the Lloyd-Booth Company, of Youngstown, Ohio, have received the contract for the erection of the 18-inch mill and the rail shears.

The Jeffrey Mfg. Company, of Columbus, Ohio, report an active business and increased demand for their elevating and conveying machinery.

The Hussey Re-Heater and Steam Plant Improvement Company, of 15 Cortlandt street, New York, report recent orders for their reheaters for some 20 different firms. One of these orders is from the Sewall & Day Cordage Company, of Boston, for both a Hussey reheater and a compound, automatic, low-pressure, feed-water heater for use in their new factory at Brighton, Mass. The waste gases from the boiler will first pass the reheater to heat the exhaust steam, and the water heater will then utilize the remaining heat in the gases. The heaters, taken together, weigh about 24,000 pounds.

Mr. Stephen Hopkins, of the Novelty Glass Mold Works, of Martin's Ferry, Ohio, has invented an improved taper reamer. The new tool, it is claimed, will bring a straight inch hole, 12 inches deep, to a $\frac{1}{4}$ -inch taper in a little less than one-third the time consumed in the old way. The tool is very simple, and is said to cost no more than the ordinary fluted taper reamer.

The Ranken & Fritsch Foundry and Machine Company, of St. Louis, Mo., have purchased the entire plant of the Smith, Beggs & Ranken Machine Company, and, as their successors, are prepared to furnish Corliss piston and slide-valve engines, steam and hydraulic elevators, and all other work in this line. Numerous improvements in building and machinery have been made, and they have added several large planers and lathes of latest pattern, thus forming one of the largest and most complete establishments of the kind in the West.

Messrs. Curtis & Curtis, of Bridgeport, Conn., write us, under recent date, that they are having some difficulty in supplying the demand for their improved die stocks and pipe-threading machines. They

have been running overtime with all the men they can work in their new factory for two months past, notwithstanding which they were compelled recently to add three hours more to the overtime, and expect soon to be obliged to enlarge their plant.

A screw-power testing machine, of large capacity, with all the recent improvements, has been erected at the United States Navy Yard, Boston, Mass. It was built by Messrs. Riehle Bros., Philadelphia, who supplied the testing machines to the United States Navy Yard at Mare Island, Cal., also at the Naval Academy at Annapolis, and the United States Military Academy at West Point. Messrs. Riehle Bros. have furnished in all nearly 30 of their testing machines to the United States Government alone. The machine at the Boston Navy Yard, above referred to, was examined and favorably reported upon by a special board of naval engineers, appointed by C. W. Melville, Chief of the Bureau of Steam Engineering. Com. W. S. Schley, Chief of the Bureau of Equipments and Recruiting, ordered this machine for the Boston Navy Yard. Another testing machine will be shipped shortly to the Thompson Electric Welding Company, of Lynn, Mass.; one to the Herreshoff Mfg. Company, of Bristol, R. I., and one to the Dennis Long Company, of Louisville, Ky.

C. A. Brackett & Co., 800 Delaware street, Kansas City, Mo., are manufacturers of Brackett's well auger and artesian well drilling machinery, for which they have built up an excellent trade. They have issued a catalogue descriptive of their specialties and giving full information how to operate well-drilling machinery. The Brackett well auger will not only bore through all kinds of earth, sandstone, magnesian limestone, coal, slate, boulders and hardpan, but is also claimed to work successfully in driving through heavy beds of quicksand. The size best adapted to general use is 11 inches in diameter and 6½ feet in length, and is composed of 12 sections of worm-shaped twists extending around the shaft, so connected by a lap joint as to form a continuous worm. The shaft has a reamer point. Two semi-circular grooves extend the full length of the shaft, forming, with corresponding grooves in the worm sections, two perfect air chambers from the top to the bottom of the auger, preventing suction and enabling the auger to be raised readily when full of dirt.

Hardware.

The Iron City Mfg. Company, who recently purchased the business of Geo. G. McMurtry, manufacturer of hot-pressed nuts, at Pittsburgh, have awarded a contract for the erection of new works, to be built on Forty-sixth street, in that city. The new building will be of corrugated iron, and will be 65 x 200 feet. It will be equipped with the latest and best improved machinery, and when completed will almost double the present capacity. It will be ready for occupancy about the first of the year.

The Bryden Horseshoe Company, of Catasauqua, Pa., last month shipped 102 tons of finished horseshoes to different parts, the largest month's business since the establishment of the works. The firm report that the demand for their goods is large and increasing rapidly, and that they are making all possible haste to occupy their new and enlarged plant, which will be ready during the next month.

It is reported that the Pacific Iron and Nail Company, of Oakland, Cal., will shortly begin the erection of a \$60,000 wire plant.

At the American Institute Fair there is an extensive exhibit of Lorrillard Refrigerators and Freezers, the articles being shown

in all sizes and styles. The space occupied is at the right-hand side of the main hall entering from Third avenue.

The entire plant of the Diamond Wrench Company, Portland, Me., has been purchased by Portland parties, who, besides the wrench, will manufacture a line of bit braces, screw-drivers, hammers, cutting nippers and padlocks. The new firm will be known as the Diamond Wrench and Tool Company. They have already commenced making important changes in their factory, adding new machinery for their specialties and remodeling the forge shop in the wrench department. The Diamond wrench is referred to as having steadily grown in favor with the trade, and especially with the exporters, and the new firm are regarded as starting under favorable conditions with orders ahead. The manufacturing will be under the direct supervision of E. C. Libby, who has received many complimentary letters both here and from abroad upon the finish and workmanship of the wrench, and he intimates that with the changes that are being made he can still improve the quality and reduce the cost of manufacture.

The Leffingwell Automatic Ash Sieve is one of several devices of the kind exhibited at the American Institute Fair, their allotted space being at the north side of the center of the hall. The patentee of these sieves is Charles Leffingwell, 55 Eighth avenue, Newark, N. J., while the other manufacturers and agents are Towel Rack and Novelty Mfg. Company, 52 Aborn street, Providence, R. I.; J. T. Hammond, 4628 Hedge street, Philadelphia, Pa., and Tiffin Union Churn Company, Tiffin, Ohio.

The Wyeth Hardware Company, of St. Joseph, Mo., are manufacturers and jobbers of hardware. In a recent interview with a representative of *The Iron Age* they stated that with them business was improving, although the summer had been dull on account of drought and the hot winds which injured vegetation in Western Kansas. The past two months have been better than the corresponding months of last year. They manufacture japanned ware, coal hods, tea caddies, oil tanks and cans of all kinds, and have enjoyed a continuously good trade in this line. They claim to be the largest manufacturers of harness and saddlery goods west of Chicago and St. Louis, and their business in that department has been well sustained, even heavier than last year. They make and sell annually about 6000 collars, between 4000 and 5000 saddles, and between 4000 and 5000 sets of light and heavy harness. They have in preparation a new catalogue, which will be out in December. Referring to the condition of general trade, they state that competition has cut the profit on staples to a very narrow margin. The political campaign has had no perceptible influence on their sales.

Silver & Co., 59 Warren street, New York, have a large variety of goods which they manufacture exhibited at the American Institute Fair. On entering the Fair building from Third avenue, the exhibit of Silver & Co. is noticed by the visitor immediately at the right-hand corner of the large room. We cannot enumerate the several articles which they show, many of which have been brought to the notice of our readers in the columns of *The Iron Age* as they appeared. Their well-known Potato Masher, Egg Poacher and Lemon Squeezer, occupy prominent positions.

E. C. Stearns & Co., Syracuse, N. Y., have been manufacturing the Stuart Window and Door Screen for the past two years, during which time the industry has grown to very large proportions. The increase in their sales during the first year

necessitated, they advise us, an almost immediate revolution in their modes of manufacture, demanding new machinery of the most approved pattern, many times doubling the number of workmen first employed and requiring new and larger buildings and quicker methods. Concerning this line of their business they give us the following facts, which are deduced from their books showing sales to October 1, 1888:

The sales of the screen frames (as of every article in our line) are recorded in books, especially gotten up for the purpose, and they will show sales of each day during the year, they being posted daily, so the accuracy of the foregoing is vouched for by us. The number sold to date mentioned, of the Stuart Window Screen, is 386,230 sets, which would supply 64,370 dwellings, allowing six screens to each; and of the Stuart Doors the number sold is 75,768 sets, which would provide screen doors for 37,884 dwellings, allowing 2 doors each. In lineal feet the molding used for windows amounts to 12,081,840 feet, and of the doors the molding measures 3,077,088 lineal feet—in miles the total is something more than 287½, and being laid end to end would reach from New York City to San Francisco or from Victoria, B. C., to the City of Mexico. We have made for use on the same of the Stuart door and window corners 214,889 pounds, or 107 tons of castings, and, taken together with the frames, make a total weight of 2,771,129 pounds, or 138½ tons, to move which would require 138 freight cars of 10 tons capacity, that amount being an average carload, on account of the bulky nature of the goods. The windows are packed in cases containing three dozen each, size 44 inches x 18 inches x 18 inches, requiring 10,728 cases. The doors are packed in cases of 1 dozen each, size, 96 inches x 9 inches x 15 inches, requiring 6814 cases for the doors, making together 135,861 cubic feet, from which a column 25 feet square and over 200 feet high could be made; all of finished frames ready for shipment. Indications point to a vigorous increase of business the coming season, and, our present space being inadequate, we are taking steps to provide for it, and have in course of construction large and commodious warehouses especially arranged for this branch of our industry.

Among the exhibits of Refrigerators at the American Institute Fair is that of B. A. Kroenke, 703 East Eleventh street, New York, who shows several styles of patent Refrigerators, his exhibit being at the west end of the main hall.

The Union Indurated Fibre Company exhibit a large and varied assortment of their manufactures at the American Institute Fair, their goods occupying a very prominent position to the left of the main hall, entering from Third avenue. Tubs, Buckets, Pails and Measures, in almost endless variety, are shown, but a special feature of the exhibit is their Water Filter, which they are just putting on the market. The beds of these Filters are made under the Gould system, now owned by the Indurated Fibre Company, and the filtering bed is inclosed in a box of Indurated Fibre, so arranged that the water in the Cooler passes down the sides of the box, entering the bottom, from which it rises to the top of the Filter Box and finally discharges through a central pipe into the reservoir below. It will be understood that by the use of Indurated Fibre all metal is avoided, and consequently there is nothing to contaminate the water. While they are intended for use in Coolers made of Indurated Fibre, they are of such size and construction as to be adapted for use in any of the ordinary Coolers in the market. As an evidence of the success that these Filters have already achieved, we are informed that the New York Central Railroad have contracted to have them put in all their Wagner cars.

S. Sudlow & Son, 559 Grand street, Brooklyn, N. Y., exhibit at the American Institute Fair Sudlow's Improved Novelty Ash Sifter, for which several advantages are claimed. By an inspection of the Sifters the visitor can gain a perfect idea of their construction and operation.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., November 13, 1888.

Pig Iron.—Business during the past week has been more or less unsettled owing to the election, and active operations have not yet been fully inaugurated. A good deal of interest and some little uncertainty is still felt in regard to the course of the market in the immediate future. Still, consumers are not likely to jump into the market on that account as if this was their only chance. The market will be here next week and next month and next year. The only difference is that the natural course of business will not be interfered with, and whatever is done will be with a feeling of confidence which could not exist while the political outlook was unsettled. Hence there should be no disappointment, because there is "no boom," neither should there be despondency if there is a little dullness and possibly some weakness in prices. Quite a number of furnaces are reported to be blowing in, which, in the face of very nearly the largest production ever known, seems to be somewhat premature and may cause an over supply if not a glut in the market just at the time when there might otherwise have been a healthy movement toward a higher range of prices. Of course there may be such a movement yet, but it will not be immediately, if all the furnaces blow in that are preparing to do so. This is probably the only unfavorable feature in the entire outlook, but it has already developed a slight hesitancy among buyers, and may lead to some weakness until supply and demand are properly adjusted. At the moment the market is neither firmer nor weaker than it was a week ago. There are some who ask a little more for their mill Irons, there are others that are meeting the demand at unchanged prices, and a few probably (whose ideas were a little inflated) might abate something to secure a desirable customer. Taking everything into consideration, there is not likely to be much change for the present either way. Furnaces are well sold up, and stocks are very light, so that there is no necessity for lowering quotations, while, on the other hand, the output and capacity for output is so large that buyers have no fears of scarcity, and are therefore waiting to see what sort of demand there is going to be for the finished product before they commit themselves to large purchases. Meanwhile the usual quotations for tidewater deliveries remain at \$16 @ \$16.25 for Mill Irons, \$17.50 @ \$18 for No. 2 Foundry and \$18 @ \$19 for No. 1, some brands being a little more than we have quoted, others a trifle less. All depends on character of brand, quantity, delivery, terms of settlement, &c.

Blooms.—The demand is fair and prices steady at about the following quotations: Steel Nail Slabs, \$29 @ \$29.50, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 @ "bloom" ton of 2464 lb.

Muck Bars.—The market is a little mixed, some quoting firm at last week's prices, while others are more disposed to meet the market. Probably \$29 @ \$30, at mill, covers both ends of the market, with the majority of sales at medium figures.

Bar Iron.—The market is a little unsettled, and in spots weaker. There are some mills that are beginning to run short of orders, and, until they are filled up,

there is not much chance of better prices. Consumption is very large, and seems likely to continue so, but there is an enormous capacity in operation, and without a constant inflow of orders there is always danger of some one cutting in so as to fill up. This appears to be the position to-day. Many leading mills have all the work they can take care of to the end of the year, but there are others, less favorably situated, who are not as firm as they would otherwise be. Buyers are quick to see this, and bid but very little over the low prices prevailing six or eight weeks ago, and while these extreme figures are not likely to be accepted, there is a willingness to compromise the matter, so that 1.8¢ @ 1.85¢ is nearer to selling prices than are the asking rates, 1.9¢ @ 2¢. On large lots for such purposes as car-building it is said that 1.75¢ has been accepted, but a good deal depends on circumstances. Prices may be better after a while, but there are a good many vacancies to be filled up before that can be accomplished. Skelp Iron is fairly steady, although, as in Bars, buyers expect to do a little better, say 1.9¢, as against 1.95¢ asked.

Plate and Tank Iron.—The demand is possibly a shade better, but not more than enough to keep prices steady. Mills, as a rule, are fully employed for the present, and the outlook is favorable for continued activity, although competition keeps prices pretty well down to the inside quotations. The market, however, is in a position to show an immediate response to anything like a heavy business, and manufacturers are carefully watching the course of events, so as to take advantage of any changes that may seem likely to occur. Meanwhile, prices remain as before—viz.: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—There is a considerable amount of small work coming in, but apart from that there is not much demand. On the whole, mills have hard work to hold their own, as many of the large orders are about completed without much prospect of them being renewed until toward spring. Prices are irregular, and on large orders rather easier, but quotations remain, nominally, as follows: 2.05¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—Thin Sheets are still in good demand, but the low numbers are neglected and difficult to move in quantity. Prices for the best makes, in small lots, are quoted as follows:

Best Refined, Nos. 26, 27 and 28....	3½¢ @ 3½¢
Best Refined, Nos. 18 to 25....	3¢ @ 3½¢
Common, ¼¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28....	4½¢ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25....	4¢ @ 4½¢
Best Bloom Sheets, Nos. 16 to 21....	3½¢ @ 3½¢
Blue Annealed.....	2.8¢ @ 3¢
Best Bloom, Galvanized, discount.....	62½¢
Common, discount.....	67½¢

Merchant Steel.—The demand is well maintained at prices as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—A better feeling seems to prevail in this market. There are inquiries for large quantities, including 50,000 tons for the Pennsylvania. Such buyers want to place their orders at inside figures, but manufacturers on that line of road are not disposed to meet the prices said to have been made by certain parties a week or two ago. For the present, therefore, there may be a "stand off," as

those who sold at low prices are filled up, while those who are in a position to take the business are satisfied to wait a few weeks longer rather than tie themselves up at what may prove to be unnecessarily low figures. Orders for small lots are frequently taken at from \$28.50 to \$29 at mill, and it is claimed to be doubtful whether anything below \$28 would be accepted for even the most desirable class of business.

Old Rails.—The market seemed to be a little duller a few days ago, but holders gave no indication of weakening, so that those needing Rails for prompt delivery finally acceded to sellers' terms. One lot of 500 tons T's sold at \$24.50, delivered at mill near Philadelphia, and lots in store are still quoted at \$24. The demand, however, is a little uncertain, and another period of dullness may follow this transaction.

Scrap Iron.—Prices unchanged. Sales chiefly at prices as follows: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought Iron Pipe.—The demand is hardly as brisk as it was, but mills for the present are well supplied with orders and discounts are steady as quoted last week, viz.: Black Butt-Welded, 52½¢; Galvanized do., 42½¢; Black Lap-Welded, 62½¢; Galvanized do., 52½¢; Boiler Tubes, 60¢.

Nails.—There is a somewhat steadier feeling, but there is no quotable change in prices, which range from \$1.90 to \$2.00, according to circumstances. Standard brands are very firm; the irregularity is more in inferior or unknown brands.

Chicago.

Office of *The Iron Age*, 96 and 97 Washington street, CHICAGO, November 12, 1888.

The result of the Presidential and Congressional elections is almost universally interpreted to mean a maintenance of present values, if not an advance. A feeling of decided confidence pervades all circles. Even those who supported the defeated candidates take this view of the situation, not because they are pleased, but because they do not now expect a decided reduction in the tariff.

Pig Iron.—Consumers have purchased to some extent, but not sufficiently to make the market active. It is noticeable, however, that among the recorded transactions are a few that can be traced to a belief on the part of buyers that under existing conditions and at present prices Pig Iron is a purchase. This view is strengthened by a knowledge of several circumstances. Chief among these is the condition of the Lake Superior Iron Ore trade. A shortage of Ore at lower lake ports is anticipated this winter in consequence of the increasing production of Coke Pig Iron and the non-accumulation of sufficient stocks during the season of navigation to meet it. It is reported that arrangements are already being made for the shipment of Ore by rail to Mahoning Valley points during the winter. Under such circumstances lower prices for Lake Superior Coke Pig Iron can hardly be expected. The furnaces in Jackson County, Ohio, making a high grade of Soft Coke Pig, have entered into a mutual compact to make their prices uniform, and have advanced their rates 50¢ @ ton, making the price of No. 1 at Chicago \$18.60, cash, or \$19.10, four months. Other furnace-men, including Southern manufacturers, are writing to their agents not only to maintain prices firmly, but to withdraw all

offers left open. The demand for Lake Superior Charcoal Pig from the Car-Wheel makers causes continued scarcity of high numbers, for which few furnace companies are willing to contract separately. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1 and 2, \$20; Nos. 3 to 6, \$20.50 @ \$21.50; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18.60; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband), No. 1, \$20 @ \$21; other Ohio Soft Irons, No. 1, \$17 @ \$18; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$18; No. 3, \$16 @ \$17; Southern Coke, No. 1 Foundry, \$17.50; No. 2 Foundry and No. 1 Soft, \$17; No. 3 Foundry and No. 2 Soft, \$16.25; Gray Forge, \$15.50.

Bar Iron.—Orders for Car Iron continue to make their appearance, and the inquiry from the general trade is also increasing. In view of the large amount of work now in sight it is deemed very probable that the mills which have recently been lowering their quotations will be able to fill up again, making the market firmer. Some of the Mahoning Valley mills have already advanced their quotations \$1 per ton. Carload lots of Common Bar Iron are now quoted at 1.72¢ @ 1.75¢, f.o.b. Chicago, half extras, but good specifications have been placed at slightly lower figures. Small lots from store are quoted at 1.90¢ @ 2¢, according to quantity and quality.

Structural Iron.—There is some demand for bridge work, but generally speaking the market is quiet. Prices continue about as last reported, except that Angles are a little easier. Mill orders are quoted as follows, f.o.b. Chicago: Angles, 2.20¢ @ 2.25¢; Universal Plates, 2.25¢ @ 2.35; Tees, 2.55¢ @ 2.65¢; Beams and Channels, 3.40¢. Small lots from store are quoted as follows: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—Business is running along in very satisfactory shape, but without special feature. Prices are well maintained, but some of the Western mills are looking a little more sharply for orders. Tubes are firm and local stocks very light. Store prices are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60¢ off.

Sheet Iron.—The weather has continued to be unusually mild, affecting this branch of trade quite unfavorably. Stocks are now abundant, and store prices are lower, No. 24 being quoted at 3.10¢, Nos. 25 and 26 at 3.20¢, and No. 27 at 3.30¢. For mill lots manufacturers' agents still quote 3¢ at mill, but are not in receipt of many inquiries, owing to the light business being done by distributors.

Galvanized Iron.—Another influx of orders from all classes of consumers is reported by mill representatives, who have, consequently, done a heavy business during the week. No change has been made in prices, small lots still being quoted at 60¢ and 5¢ off for Juniata and 60¢ and 10¢ off for Charcoal.

Merchant Steel.—A quiet week has been experienced in this branch of trade, but inquiries for cheap Steel are increasing and a good trade is looked for soon in such specialties. Since the break in the price of Open-Hearth Spring Steel quite a number of orders have been placed quietly and consumers are now pretty well supplied. It is quoted at 2.60¢ @ 2.70¢, in a jobbing way, but the large orders referred to were, of course, taken at a considerably lower figure. Crucible Spring Steel has been reduced to 3.75¢.

Other quotations are as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Considerably under 10,000 tons were sold by local mills during the week, including orders for delivery this year and in 1889. Some of the large orders recently in the market, and which gave much encouragement to manufacturers, have dwindled to very insignificant proportions when the contracts came to be closed. Makers still quote \$30 on general business.

Old Rails and Wheels.—So far as can be ascertained but one sale of Old Iron Rails occurred in this vicinity during the past week. The price realized was \$22.60. An offer of \$24, delivered in the Mahoning Valley, was refused for a lot of several hundred tons, the holder expecting to obtain from \$22.50 to \$23 here. A small quantity of 35-pound Rails was offered at \$24, Chicago, without takers, and for another lot of Light Rails \$24, East St. Louis, was asked. Old Car-Wheels are nominally quoted at \$19.50 @ \$20.

Scrap.—Actual business has been very light, but inquiries are increasing and an early movement is looked for, especially in No. 1. Wrought Mill Scrap is neglected for the time, and Cast is not much better. Mixed Country Scrap is worth \$14 @ \$15. Selling prices of carefully selected Scrap are as follows, per ton of 2000 lb: No. 1 Forge, or Railroad Shop, \$21; Track Scrap, \$20; Horseshoes, \$20; Axles, \$26; No. 1 Mill, \$15 @ \$16; Pipes and Tank, \$13; Light Wrought, \$11; Cast Machinery, \$14 @ \$14.50; Stove Plate, \$12; Cast Borings, \$9 @ \$9.50; Wrought Turnings, \$12 @ \$12.50; Axle Turnings, \$14; Coil Steel, \$14.50; Leaf Steel, \$15.50; Locomotive Tires, \$15.50. While city dealers name these prices, consumers are not yet disposed to meet them, and assert their ability to get a supply from outside at lower figures.

Hardware.—The demand for Shelf Hardware is back again to the large proportions reached before the election, a falling off having been experienced early in the week. A full month of great activity is now confidently expected. Wholesale merchants report a very encouraging outlook for next year, based on advices from their traveling salesmen of an enormous amount of building contemplated all over the Northwest. In Heavy Hardware business has been rather quiet, but an improvement is expected shortly.

Nails.—Manufacturers' agents report a light business in Cut Nails. Large buyers, however, are beginning to look around with a view to laying in stocks, and heavy orders may soon be placed if prices are made to suit them. Continued weakness prevails in Steel Nails, and they are now quoted at \$2 from store. In carload lots they are sold at \$1.90 on track here. Wire Nails are firm, notwithstanding the weakness in the Steel Cut Nails, and are still held at \$2.60 for small lots.

Barb Wire.—A steady increase is reported in the demand, and jobbers note the receipt of inquiries for carload lots as an encouraging indication for the future. The impression prevails that a very heavy demand from all classes of dealers will be experienced before the year closes, as stocks can be laid in at the present low prices without much fear of a decline and the trade will then be prepared for the usual spring demand for consumption. Small lots are quoted at 2.90¢ for Painted and 3.60¢ @ 3.65¢ for Galvanized, with the usual difference for carloads.

Pig Lead.—On limited transactions the market receded during the week from 3.70¢ asked at the beginning to 3.60¢ at the close.

The Union Pacific Railroad Company opened bids at Omaha on the 10th inst., for 2500 cars, principally freight cars, but including some passenger and refrigerator cars. The successful bidders were the Peninsular Car Company and the Michigan Car Company, of Detroit, and the Pullman Palace Car Company and the Wells & French Company, of Chicago. Other car orders are on the market, which will probably be placed this week.

The Clark Fuel Saving and Smokeless Furnace Company, of Chicago, have been incorporated, with a capital of \$150,000, by J. W. Thatcher, G. A. Clark and W. S. Gibbs.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. (CINCINNATI, November 12, 1888.)

Pig Iron.—Confidence is now the feature of prominence in the Iron interest, and there is some indulgence in talk of higher prices, but there is no evidence of appreciation in the near future. There is, however, a more active inquiry, and some transactions of moment have been made which may eventually result in strengthening the market to such a point that an advance may be obtained. The prospect which is more apparent is that the prices prevailing before the election may now be maintained, and not suffer the decline which was believed to be in store should the country have given its sanction to a radical change in tariff and other revenue laws. The aggregate sales of both Foundry and Forge Iron since the election have been encouraging, but these have been made on the basis previously quoted. The Pipe works "across the river" from Cincinnati are reported to have contracted for over 5000 tons of Iron during the past few days, but the details of the transaction have not been made public. Jackson County furnaces are reported to have advanced prices 50¢ per ton, but no sales are reported as having been made at the advance. There is quite an active inquiry for iron to be delivered during the next year, but the feeling is not enough settled yet to bring about harmony between buyers and sellers. It is reported that there is an unusual shortage in the supply of Lake Ores, which fact has a sustaining influence upon the price of Iron made from such Ore. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1	16.50 @ 17.00
Southern Coke, No. 2	15.75 @ 16.00
Southern Coke, No. 3	15.50 @ 15.75
Ohio Soft Stone Coal, No. 1	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2	15.50 @ 16.00
Mahoning and Shenango Valley	17.50 @ 18.50
Hanging Rock Charcoal, No. 1	20.50 @ 22.50
Hanging Rock Charcoal, No. 2	19.50 @ 22.00
Tennessee and Alabama Charcoal, No. 1	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2	17.00 @ 18.00

Forge.

Strong Neutral Coke	14.75 @ 15.00
Mottled Neutral Coke	13.75 @ 14.00
Gray Forge	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel	20.00 @ 25.00
Hanging Rock, Cold Blast	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable	20.50 @ 21.50

Nails.—The market remained steady, with a moderate jobbing trade. Jobbing prices are based upon 12d @ 40d, which sell at \$2.10 per keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 per keg.

Manufactured Iron.—The market for Manufactured Iron for the time being remains quiet; machine shops and other moderate consumers are making small purchases from day to day, but carriage builders and other large interests are not yet ready to contract for supplies, and probably will buy but little until after the first of the year. The easier feeling noted

a short time ago has given place to a steady and confident tone. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ @ lb.

Old Material.—There have been moderate sales of Old Wheels, one lot of 200 tons selling at a little less than \$19, cash, here. Old Rails have been quiet and a little easier in tone, but are not quotable under \$28, spot cash.

Cleveland.

CLEVELAND, November 12, 1888.

Iron Ore.—Producers have drawn so many lake carriers into service since October 1 that last season's record of total shipments has been overhauled and passed. Up to Saturday, November 10, 4,279,227 tons of Ore had been sent down from the Upper Lake region by lake vessels, against 4,142,899 tons at a corresponding period last year. During the past week 140,000 tons were shipped, that amount being 20,000 tons in excess of the shipments for the same week in 1887. Of the 4,279,227 tons sent down this year the Marquette Range has contributed 1,661,153 tons; the Gogebic Range, 1,172,589 tons; the Menominee Range, 1,036,666 tons, and the Vermillion Range, 408,819 tons. The market maintains all of the firmness that has characterized it during the past two months. Although very little Ore remains to be sold, buyers have made liberal inquiries, and many odd lots of non-Bessemer have been sold at prices ranging all the way from \$4.50 to \$5.25 @ ton. The mine owners are now awaiting statistics relative to the Ore consumption for the year in order to arrange their estimate of output and prices for 1889. At present everything seems to warrant the producers in making all possible arrangements for increasing their output for next season to its greatest possible proportions. The railway interests promise a better demand for Steel Rails, and there is every indication of a liberal buying movement in every direction.

Pig Iron.—Buyers and sellers have been giving too much attention to the election and its results to warrant any activity in the Pig Iron market. The outcome of the great contest has given the market a buoyant tone, and big business is expected to succeed the quietness now prevailing. The consumption of all grades of Pig Iron continues very large, and furnacemen report themselves crowded to the uttermost to fill their orders. Prices are very firm at the same quotations furnished for the past three weeks, and the tendency seems decidedly in the direction of advances.

Old Rails.—Several round lots of Old Americans have been sold during the week at \$24 @ \$24.25. No. 1 Choice Scrap is worth \$23.

Coke.—Prices are slowly advancing, and the rate at the ovens at the beginning of the new year will probably be \$1.50 @ ton.

Nails.—Steel Nails have dropped to \$1.95, but common Iron Nails are still quoted at \$1.90.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, November 12, 1888.

Pig Iron.—We note a little better feeling in the trade, both with producers and buyers. The question of the future policy of the Government, for a few years at least, being apparently settled, the opinion prevails that Iron will not recede any in price, but will probably advance in the near future. Prices have as yet undergone no change, but the disposition of the fur-

naces is to sell as little as they can and keep their yards clear of Iron. This they are doing without much, if any, effort to sell. Some large consumers are showing a disposition to contract for their supply for the coming year, but so far as can be ascertained but few such contracts have been made. The new stacks that will soon blow in are apprehending no trouble in being able to sell their output as fast as produced, and, taking all things into consideration, the situation, as a general thing, is satisfactory. Prices are ruling about the same; quotations unchanged.

Louisville.

LOUISVILLE, KY., November 12, 1888.

Pig Iron.—The market is in a very excited condition, and offers have been made for large quantities of Iron, resulting in sales for delivery through six to eight months. Furnaces, however, have only accepted a portion of the offers made, and are not willing at present to book orders at old prices, but prefer to wait until they can judge of the extent of the advance before effecting sales for large blocks of Iron. We will not revise quotations, as the market is so unsettled it is impossible to tell what is the price of Iron to-day. We quote as follows:

Southern Coke, No. 1 Foundry	16.75 @	17.75
" " " " " "	15.75 @	16.25
" " " " " "	15.25 @	15.75
Hanging Rock Coke, No. 1 Foundry	17.00 @	17.50
Hanging Rock Charcoal, No. 1 Foundry	20.75 @	22.00
Southern Charcoal, No. 1 Foundry	17.75 @	18.25
Silver Gray, different grades	14.25 @	15.00
Southern Coke, No. 1 Mill, Neutral	14.50 @	15.00
" " " " " "	13.50 @	14.50
" " " " " "	14.00 @	14.50
" " " " " "	15.50 @	16.25
White and Mottled, different grades	13.25 @	13.50
Southern Car-Wheel, standard brands	22.75 @	23.75
Southern Car-Wheel, other brands	19.00 @	21.00
Hanging Rock, Cold Blast	22.00 @	25.00
Hanging Rock, Warm Blast	19.00 @	20.00

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave., PITTSBURGH, November 13, 1888.

Now that the election is over and the excitement incident thereto has subsided, an improvement in the iron and steel business is expected. There is no disguising the fact that manufacturers generally are well satisfied with the result, and many of them did what they could in bringing it about. Certainly a better feeling obtains, as confidence has been re-established and the outlook for the winter is encouraging.

Owing to continued shipments of coal for almost two months, the down-river markets are all overstocked and prices are down lower than they have been for a number of years. At Cincinnati, Pittsburgh Coal is being sold at 5½¢ per bushel by the barge, which scarcely covers cost laid down at that point. At New Orleans, the price was reduced a few weeks ago, and still further reduction at all points south is not improbable. There is continued complaint on the part of many manufacturers in regard to the enhanced cost of natural gas as fuel, and some of them threaten to go back to coal.

Pig Iron.—There has been no important change in the general position of the market during the week under review, with the exception that, as already noted, a better feeling obtains in view of the result of the Presidential election. There was a good deal of business pending on the result of the election; extensive improvements will now be pushed forward, which would not have been had the result been otherwise. An increased demand for Pig Iron is looked for, and already some of the larger consumers are buying more freely. The outlook, therefore, is very encouraging, and the indications for a good trade throughout the winter are

promising. Consumption, which has been large all this year, will probably be increased, and furnacemen here and elsewhere will probably have about all they can do. It is thought that consumers will now be more disposed to anticipate future events. It is felt that the price of the finished products will have to go up before there can be much improvement in the price of Pig, although there is sometimes an upward move in the latter, which is followed by the former. The furnaces not only here but throughout this district are pretty well sold up—some of them a month or two ahead, and with the demand likely to be increased, there is every indication for a healthy and active market for some time to come. Quotations may be fairly given as follows:

Neutral Gray Forge	\$15.75 @	\$16.25 cash.
All Ore Mill	16.75 @	17.25 "
White and Mottled	14.50 @	15.25 "
No. 1 Foundry	17.50 @	18.00 "
No. 2 Foundry	16.75 @	17.00 "
No. 1 Charcoal Foundry	24.00 @	24.50 "
No. 2 Charcoal Foundry	21.50 @	22.50 "
Mill Charcoal	19.00 @	20.00 "
Cold Blast Charcoal	25.00 @	28.00 "
Bessemer Iron	17.50 @	18.00 "

Sales of some 4500 to 5000 tons Gray Forge reported at \$16 @ \$16.25 cash, mostly at inside quotations.

Manganese.—Sales of 80 % Ferro at \$56 @ \$56.50, cash; Spiegel quoted at \$28 @ \$28.50 for 20 %.

Muck Bar.—There is, as noted in our last, more inquiry, and the market is firmer; may be fairly quoted at \$29 @ \$29.50, cash, with a sale of 1000 tons reported at \$29. It appears that those mills making a specialty of Muck are well sold up, and this accounts for the limited offerings.

Manufactured Iron.—The demand was curtailed somewhat by the election excitement, but now that is over and the result very generally satisfactory to those engaged in the business, an increased business is looked for. Bars, 1.70¢ @ 1.85; No. 24 Sheet, 2.85¢ @ 2.90¢; Plates, 2.15¢ @ 2.25¢; Skelp, 1.80¢ @ 1.85¢ for Grooved and 2.10 @ 2.12½¢ for Sheared; all 60 days, 2 % off for cash.

Nails.—There is no change to report in the general situation. Dullness is still the order of the day, as is to be expected at this particular time, and no improvement can reasonably be looked for until the spring trade opens up. We continue to quote at \$1.90 for 12d to 40d, 60 days, 2 % off for cash.

Wrought Iron Pipe.—The demand has commenced to fall off, as it usually does at this season of the year, and there is not likely to be any improvement until the spring trade opens up. Manufacturers do not expect to do much during the winter season. Prices remain unchanged. Discounts on Black Butt-Welded Pipe, 52½ %; on Galvanized do., 45 %; on Black Lap-Welded, 62½ %; on Galvanized do., 52½ %; Boiler Tubes, 60 % off regular list; Two-inch Tubing, 13¢ per foot, net; 5½-inch Casing, 40¢ per foot, net.

Old Rails.—American Tees are still quoted at \$25 @ \$25.25, cash. As the work of lifting will be suspended with the advent of colder weather, the market is likely to stiffen, as there will, no doubt, be a falling off in the offerings within the next few weeks.

Billets, &c.—There is a fair demand for Billets, but at unchanged prices—\$29 @ \$29.50, cash, at maker's mill; Nail Slabs, \$28.50 @ \$29; Domestic Bloom and Rail Ends quoted at \$19 @ \$19.50.

Steel Rails.—There is more inquiry. The Allegheny Bessemer Steel Company, of that city, is reported as having taken an order from the New York Central and Hudson River Railroad for 1000 tons, but the firm decline to give the price. The mill of the Allegheny Steel Company is

new, has not yet been started up, but it is understood that it will be in January, if not before. In addition to the sale in question another of 5000 tons was reported.

Railway Track Supplies.—Spikes are higher, and we now quote at 2.20¢, 30 days, delivered; although we did hear of an offer to deliver 2500 kegs at Chicago at 2.25¢, which, with a 15¢ freight rate, would only be 2.10¢ here. Splice Bars, remain unchanged at 1.85¢ @ 1.90¢; and Track Bolts at 2.85¢ with square and 2.95¢ with Hexagon Nuts.

Merchant Steel.—There is a fair business at unchanged prices. Best Brands of Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-Hearth do., 2½¢.

Old Material.—We can report sales of No. 1 Wrought Scrap at \$21, net ton; Old Car Axles at \$15; Wrought Turnings, \$14.50; Cast Scrap, \$15.50 gross ton; Old Car-Wheels, in absence of sales, quoted at \$20, gross. Sale short pieces Old Steel Rails at \$18.50, gross ton.

New York.

Office of *The Iron Age*, 66 and 68 Duane street.
New York, November 14, 1888.

American Pig.—Current business is small, consumers being supplied and furnaces being filled with orders. Interest in next year's business is beginning to be manifested. Founders are feeling the market on the one hand, and on the other some furnaces, among which a few Southern companies are prominent, are endeavoring to sell pretty far ahead into 1889. It is reported that some transactions of this character have been closed at \$17.50 for No. 1. Southern for 1889 delivery. We understand that an Eastern Rail mill, now idle, will soon be in the market with Foundry Iron. We continue to quote Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is very quiet, with prices remaining: Coltness, \$21, @ 21.50, nominally; Shotts, \$20.75 @ \$21; Langloan, \$21, and Dalmellington, \$20 @ \$20.25.

Spiegeleisen.—No business has been done and prices remain nominally \$27 for German 20 %.

Bessemer Pig.—We note one recent sale, to a New England mill, of 1000 tons Domestic Bessemer at private terms.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.5¢ @ 2.55¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Bar Iron.—The market is quiet. On a specification for the Pacific Coast the Flats went abroad, while on the Rounds a Pittsburgh mill bid 1.67½¢. We quote: Carload lots, half extras, 1.67½¢ @ 1.7¢ for Common; 1.7¢ @ 1.8¢ for Medium, and 1.8¢ @ 1.9¢ for Re-fined, with prices for fancy brands running up to 2.4¢ @ 2.5¢.

Steel Rails.—So far as reported, the sales of the two Eastern mills, which have taken the majority of the contracts lately, foot up to 47,000 tons, of which 20,000 tons have gone to a trunk line, and the bulk of the balance to Southern roads, although it is reported that there is a hitch in the one transaction involving 14,000 tons. Thus far, the greater part of the business done by Eastern mills has been with old roads who have bought for re-

newal work exclusively. With the exception of a few, all the leading New England lines have purchased their 1889 requirements. When the Pennsylvania order for 40,000 tons, now pending, is closed, the principal trunk lines will be supplied. The South has ordered to a considerable extent, so that soon the greater part of the regular yearly work for the Eastern mills will be closed. The bulk of it has undoubtedly gone to the two mills alluded to above. Prices are still unsettled, and while nothing definite is known it is the prevailing opinion in the trade that \$27 has been shaded in closing some of the business. In Pittsburgh \$26 has been done in at least one instance, and \$26.50 has probably been accepted for other orders, the reports of \$28.50 there by local newspapers being incorrect. This would be equal to \$29.50 at Chicago, which there is reason to believe has been shaded by local mills there. The Chicago price of \$26.50 would not net Eastern mills which might attempt to enter that market more than \$25.50, so that any competition on their part west of the Allegheny Mountains is impossible. The Eastern market is therefore narrowed down to Eastern and Southern business, to be handled practically by four mills, of which one has quoted above the prevailing price for some time past, while another has not followed it closely, leaving the other two to book considerably ahead. There are signs of the possible early withdrawal of one or both for the present at least, so that it seems likely that the bottom has been reached and that a moderate stiffening may come at an early date. Indeed, we know of one contract closed this week for delivery over the first half of 1889 on which \$28 was realized. Relatively the Eastern mills have taken far more business than those of the West, though some fair contracts have been placed there during the past week. It is probable, however, that the center of interest in the Rail market will be transferred west of the Allegheny Mountains for some time to come, the situation being complicated by the possible aggressiveness of the new Pittsburgh mill, intensifying the struggle between that center of production and Chicago. We quote \$27 @ \$28 at Eastern mill. It is reported that the Oregon order repeatedly referred to has been withdrawn for the present.

Billets and Blooms.—A large New England Wire mill is reported to have placed lately a contract for 50,000 tons of Wire Billets abroad, for delivery in 1889, at the rate of 4000 tons a month, freight contracts having been closed for its shipment from this port to Providence. Simultaneously they placed large orders with two Eastern mills for earlier delivery at private terms. Nail Slabs are being held quite firmly by mills in Central Pennsylvania at \$28.75 @ \$29, at Steel works, and that only for early delivery, 1889 orders being quoted higher. A few of the Nail mills state that they cannot pay such prices and sell the Nails at \$1.65 @ \$1.75, at mill, as they have been doing.

Wire Rods.—The market for foreign Rods is very dull at \$39, nominally, for Basic. Acid Rods can be purchased at \$38.25 and possibly less.

Old Rails.—We note a sale of a 2000-ton lot, delivered on the Hudson River, for a Western mill, at private terms, and a sale of a 500-ton lot from a road debouching on the Hudson River at the reported price of \$22.50 on cars at Jersey City. The condition of the market remains peculiar, small lots cropping up, which are disposed of at \$22.50, while larger lots could probably not be bought at less than \$23, which holders claim they are offered.

Track Material.—An active business is reported in Spikes, which are selling at

\$2.20 @ \$2.30, delivered. Angle Bars are quoted at 1.80¢ @ 1.90¢, at mill.

Financial.

Railroad troubles for the moment absorb a large share of attention on the part of financiers and the mercantile classes generally, the "pool" seemingly having gone to pieces. All the trunk lines, long under the supervision of Commissioner Fink, are engaged in a desperate warfare, with prices recklessly cut. West-bound freights to Chicago and Missouri River on Monday suddenly dropped about 50 % on all classes. A Chicago dispatch says the new west-bound rates are: First class, 50¢; second, 40¢; third, 35¢; fourth, 30¢; fifth, 25¢; sixth, 20¢. The old rates on the several classes were 75, 65, 50, 35, 30 and 25¢. The schedule was advanced only a few weeks ago by a general agreement of the trunk line presidents. All rates now drop back to the old war basis. East-bound commodity rates were advanced by easy stages until they were about to reach a remunerative basis, when something gave way and down they tumbled. The slump in west-bound rates makes the demoralization nearly complete. The Burlington on Monday announced a cut of 25 % on freight rates from the seaboard to St. Paul, to take effect immediately. Following are the rates: First class, 85¢; second, 74¢; third, 62¢; fourth, 46¢; fifth, 39¢, and sixth, 31¢. As to the provocation for this new outbreak there is much crimination, some alleging that Erie is at fault, while the New York Central openly charges the Pennsylvania with being the principal aggressor. All the parties directly concerned were represented at a general meeting of freight agents on Monday, at which time the New York Central announced that rates from New York to Chicago would be lowered from 75¢ to 50¢ per 100 lb on first-class, and corresponding to 40¢, 35¢, 30¢, 25¢ and 20¢ on other classes. To Missouri River points they would carry freight on the Chicago basis for 45¢, 36¢, 32¢, 28¢, 24¢ and 19¢. The Pennsylvania and others represented signified their intention to meet these rates. The Erie insists on its differential rate, and has put in force rates from New York to Chicago ranging from 45¢ to 19¢, or from 5¢ to 1¢ per 100 lb below the rate by the New York Central. President Roberts, of the Pennsylvania, says in self-justification: "The Pennsylvania has reduced its rates because others have done so. We have all the business we can properly handle, but if other roads reduce their tariffs the Pennsylvania must do so, too." He regards the present situation as serious. From all quarters come reports of a heavy tonnage to be hauled for months to come and a scarcity of rolling stock on the more important systems. These conditions are not reflected in the earnings, however, because at the rates now ruling the old roads can make little if any profit. Lake and canal rates for October were scarcely half as high as a year ago, owing to the wheat corner in Chicago, which checked the forward movement. The returns of yield of corn, made to the Department of Agriculture, indicate a yield per acre larger than any crop since that of 1880, the aggregate being very close to 2,000,000,000 bushels.

The Stock Exchange markets have been dull and weak. In London on Thursday there was some selling at a decline, and there was a fall in Reading. On Friday stocks were steady after an opening break, with foreign houses free sellers. On Saturday the business in railroad bonds was large and well distributed. In usually well-informed circles it was stated that nothing of importance would be done until next month in connection with the Oregon Transcontinental Company. The report

of Western rate cutting operated to hold the market in check to some degree. On Monday news that the trunk lines had cut rates from the seaboard to Chicago about 33 % started free selling of these properties, but the declines were only fractional. Western Union was especially affected by the decision against the Bell Telephone, and this naturally affected all Boston properties. On Tuesday the market was unsettled, with the trunk lines weakest, in consequence of the cut on west-bound rates, and Reading and other coal was unfavorably affected by raids.

United States bonds were firm and 4s advanced. Up to date the Department has purchased, under the April circular, \$51,392,000 4s and \$43,422,250 4½s. The purchases during the past week have been \$2,654,400 4½s—all at 108½—against \$2,412,500 the previous week. Sales as follows:

U. S. 4½s, 1891, registered.....	107½
U. S. 4½s, 1891, coupon.....	108½
U. S. 4s, 1907, registered.....	127½
U. S. 4s, 1907, coupon.....	127½

The weekly statement of the New York City banks shows a loss of \$2,893,800 in cash in consequence of the overflow of currency to the West and South. The reduction of \$1,043,500 in circulation attracted more attention than other changes. Although the surplus reserve is reduced to \$11,558,600, a decrease of \$2,172,650 for the week, it is still higher than in 1887 and 1886, the excess then having been, respectively, \$8,587,400 and \$7,891,350. The demand for commercial paper is good, the supply limited. Rates for 60 @ 90 days' indorsed bills, are 4½ @ 5 %; longer dates, 5 @ 6½ %.

The market for sterling was steady, but without much activity. Posted rates were \$4.85 for 60 days, and \$4.88½ for demand. By reason of a plentiful supply of commercial bills drawn against cotton, the movement of which is very free just now, the foreign exchange market had an easier tendency. There is a general expectation of lower rates in the near future.

The quickened movement in business is less than some had predicted, but the tendency is in the right direction. This is true of the dry goods jobbers, the tone being firm. Should wool advance manufacturers hope to get last year's prices at the opening of the new season. Some very fair orders for spring fabrics have been received from the West and South. Holiday goods receive special attention. Cotton was in lessened demand at unchanged prices, except at Norfolk and New York, which declined ½¢. Among grocery jobbers sales are slow but values are preserved. Raw sugars are stronger. A special feature is the importation of some 25,000 bags of sugar from Bremen, Hamburg and Copenhagen. In ocean freights the export movement to South America and the United Kingdom is embarrassed by the scarcity of suitable tonnage. Cotton freights are easy. A reduction of 50 % in the Portuguese import duties on wheat enabled exporters to sell something like 200,000 bushels of wheat for shipment to Lisbon; otherwise the export trade has not improved. Wheat is about 1¢ per bushel higher; flour has advanced a little and corn is ¾¢ higher.

The imports of merchandise at this port during October were very large, amounting to \$41,262,000, or nearly \$2,000,000 above the large total for the corresponding month last year, when the imports included \$11,000,000 in specie. Omitting this last item from the calculations, October is the banner month in the history of the trade, excepting October, 1882. The exports for the month, exclusive of specie, make a total of \$27,954,657. The total for the whole country for nine months, ending August 31, shows an excess of imports equal to \$65,418,000. It is possible that the demand for our produce during the ensuing two months may make up

this deficiency, but, from the present outlook this will be the smallest year's exports of produce and merchandise for a very considerable period.

The imports of merchandise at this port during the week were valued at \$7,133,000, of which \$1,729,000 represented dry goods. Since January 1 the total is \$102,542,000, against \$406,809,000 for the same time last year and \$370,033,000 in 1886. Exports were valued at \$6,081,000. The failures during the last week throughout the United States and Canada aggregated 226, a decrease of 49 from the total of the preceding week.

To provide for the celebration next April of the 100th anniversary of the first inauguration of General Washington as President of the United States, the Legislature made the 30th of April next a legal holiday. As many persons are now signing notes and drafts maturing during the first four months of the ensuing year, it may be well for them to take note of the fact.

According to the Boston Post, the total bank clearances last week in 38 cities showed a decrease of 6.6 %, compared with the corresponding week last year, due chiefly to the heavy falling off in New York, which was 10.4 % less than last year, for the cities outside of New York showed an increase of 0.6 %. The election holiday had a restricting influence.

Metal Market.

Copper.—The London market gave way during the week with spot Chili Bars from £78. 5/ to £78. 2/6, futures remaining steady, £79, while good merchantable brands also lost 2/6, closing at £78. 2/6, and Best Selected remained sustained at £83. Sales 775 tons. Here the market has been inactive and featureless, speculation being extinct and the syndicate supplying on private terms the moderate amounts consumers may stand in need of. The price of Lake is 17.50¢ nominally, and 16¢ @ 16½¢ is the quotation for Casting brands. On 'Change the bids have been 17¢, spot, and 17.30¢, November and December, with sellers at 17.60¢ the later deliveries. Messrs. James Lewis & Son, November 1, write from Liverpool about the syndicate: "To pay the producing companies a higher price means the giving up of the very moderate profit (probably not more than £5 per ton) at present realized by the syndicate on the Copper they sell, or the further advancement of prices, which will still further tend to reduce consumption and stimulate production. They are therefore in a dilemma from which it is difficult to see how they can extricate themselves." The import of American Copper into Liverpool and Swansea the first ten months has been 20,555 tons Fine, against 11,329 tons same time last year.

Tin.—A decline has taken place in the London market since our last report from £102, spot, Straits, to £100. 15/, and in futures from £102. 12/6 to £101. 10/; sales, 170 tons. Here the tendency has also been downward, with sales of 70 tons January at 22.50¢ @ 22.60¢ and 40 tons February at 22.55¢ @ 22.65¢. Spot rules nominally at 22.60¢, in small lots; for spot and November 22.30¢ @ 22.35¢ may be quoted, and December, 22.30¢ @ 22.50¢. The consumptive demand is very moderate, consumers only operating from hand to mouth, expecting a sudden important drop.

Tin Plates.—The demand has been very quiet during the week, and prices generally have been a shade lower. There has been a small amount of business done for forward delivery, but the bulk of that offering is still held back for lower prices. We quote at the close, large lines, 3 box: Siemens-Martin Steel, Charcoal Finish, \$5 @ \$5.75; Coke Finish, \$4.70; Ternes,

\$4.10 @ \$4.25; Bessemer Cokes, \$4.85 @ \$4.45; and Wasters, \$4.20. Cokes are 13/3 @ 13/6 at Liverpool.

Lead.—About 1000 tons Common Domestic have been sold in the open market at 3.70¢ @ 3.75¢, most of it, but the last at 3.75¢, which is the nominal spot value to-day, but with a downward tendency, stocks in store being larger and the season at an end, while production is known to be large. On the Exchange 200 tons changed hands during the entire week, sales of about 150 tons January having been made to-day at 3.75¢. St. Louis is 3.50¢ @ 3.55¢, and weak. London quotes Soft Spanish £13. 7/6, and English Pig £13. 15/-. On 'Change 48 tons January brought 3¼¢.

Spelter.—Has developed no new features, but remained only very moderately active at 5¼¢ @ 5½¢ Common Domestic, but for the dullness it would be higher, and Silesian at 6¢; the London quotation for the latter being 5/ off—£18. 12/6.

Antimony.—Hallett is unaltered at London, £48, and here, with a fair demand, 10¼¢ @ 10½¢, while Cookson remains steady at 12¼¢ @ 13¢.

New York Metal Exchange.

The following sales are reported:

THURSDAY, November 8.	
16 tons Lead, December.....	3.72½¢
10 tons Tin, January.....	22.60¢
20 tons Tin, January.....	22.55¢
MONDAY, November 12.	
30 tons Tin, January.....	22.50¢
10 tons Tin, February.....	22.55¢
10 tons Tin, February.....	22.60¢
20 tons Tin, February.....	22.65¢
32 tons Lead, January.....	3.77½¢
TUESDAY, November 13.	
10 tons Tin, January.....	22.50¢
48 tons Lead, spot.....	3.70¢
16 tons Lead, November.....	3.70¢
16 tons Lead, January.....	3.75¢
240 tons Lead, January.....	3.75¢
WEDNESDAY, November 14.	
144 tons Lead, January.....	3.75¢

Coal Market.

The Anthracite Coal trade is dull, and prices are weak under excessive production. The line trade is an exception to this remark, orders of some magnitude having been placed during the week for furnace and mill consumption, but in these instances it is said that some concession was granted. Operators in the Scranton region are now working on three-quarter time, and the effect is seen in the reduced tonnage. The total production for the week ending November 10 was 775,107 tons, which is only 45,000 tons more than for the corresponding week in 1887. Since January 1 the aggregate is 32,927,210, as compared with 29,714,677 for the same time last year, an increase of about 3,000,000 tons. It is said the Schuylkill Canal will be closed this year on November 30, no matter what the weather is at the time. It has been usual to keep navigation open, but in past years, and especially last year, this has resulted in many boats being frozen up. The Reading officials say it is better economy to close the canal early.

The Bituminous trade is moderately active, but the interior demand has fallen off. Cumberland reports 60,000 tons for the week, and Clearfield 50,000 tons, which, in each instance, is a decrease of 10,000 to 12,000 tons compared with the corresponding week last year.

The report of the Geological Survey of the United States for the year 1887, about to be issued, shows that the total number of short tons of Coal mined last year was 129,975,557, and the value at the mines was \$182,556,837, an increase of \$27,956,604. During 1887 Pennsylvania produced 31,516,856 short tons of Bituminous Coal, an increase of 4,398,725

tons. The production of Anthracite Coal in that State in 1887 amounted to 29,506,255 short tons, and the value at the mines was \$79,865,244.

A scheme to open up a direct line from the Pennsylvania Coal regions to the manufacturing centers of New England has been initiated by the leasing of the Newburg, Dutchess and Columbia Railroad to the New York and Massachusetts Railway Company. Contracts have also been made with the Lehigh and other companies on the west side of the Hudson which have access to the Coal fields.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from November 2 to November 9, inclusive, and from January 1 to November 9, inclusive, were as follows:

Iron and Steel.

	Nov. 2 to Nov. 9. Tons.	Jan. 1 to Nov. 9. Tons.
Pig Iron: Crocker Bros	795	11,792
G. T. Carter	500	630
G. W. Stetson & Co.	400	14,050
Naylor & Co.	200	7,445
James Williamson & Co.	200	5,200
N. S. Bartlett	200	5,000
The Hartford Casting Co.	57	57
R. Crooks & Co.	50	100
Spiegelstein: Crocker Bros.	425	11,105
Naylor & Co.	300	11,432
J. A. Jansen	279	11,671
Geisenheimer & Co.	30	290
Steel: G. Lundberg.	77	283 1/4
Oelrichs & Co.	60	450
J. Abbott & Co.	50	549
W. F. Wagner	39	1,304
R. Crooks & Co.	31	61
R. H. Wolf & Co.	22	585
A. Milne & Co.	20	1,195
H. W. Belcher	15	22
F. S. Pilditch	7	482
R. F. Downing & Co.	6	218 1/4
Chas. Hugill	6	270 1/4
C. F. Boker	3	214 1/4
Temple & Lockwood	3	14
Steel Rods: Naylor & Co.	617	17,733
R. H. Wolf & Co.	201	3,732
Cary & Moen	43	824
J. A. Roebeling's Sons	37	1,532
Steel Plate Cuttings: Naylor & Co.	52	147
Steel Billets: A. Milne & Co.	45	960
J. H. Steinberg & Co.	2	2
Steel Sheets: Ogden & Wal- lace	23	200
Pierson & Co.	12	984
Steel Bloom Ends: Dana & Co. Steel Wire: J. A. Roebeling's Sons	19	1,409
Steel Scrap: Funch & Co.	123	376
Iron: J. Abbott & Co.	250	7,123 1/4
W. H. Holt	125	125
Bacon & Co.	10	312
Oelrichs & Co.	3	3
Swedish Rough Bars: C. v. Philp	40	406
Iron Girders: R. F. Downing & Co.	36	538 1/4
Swedish Bar Iron: C. v. Philp	140	538
Iron Beams: R. F. Downing & Co.	4	329
Wire Rods: R. F. Downing & Co.	54	66
Swedish Rivet Rods: C. v. Philp	54	211
Charcoal Iron: Naylor & Co. Sheet Iron: T. B. Coddington & Co.	126	731
Cotton Ties: Bullard & W.	46	1,380
	25	1,745

Tin Plates.

	Boxes.	Boxes.
T. B. Coddington & Co.	3,970	150,505
G. T. Carter	3,583	3,583
Pratt Mfg. Co.	2,935	154,741
G. B. Morewood & Co.	2,437	45,725
Phelps, Dodge & Co.	2,320	507,121
A. A. Thomsen & Co.	1,547	129,957
R. Crooks & Co.	1,336	68,010
Dickerson, Van Dusen & Co.	721	249,011
Merchant & Co.	629	20,839
Corbiere, Fellows & Co.	535	7,393
Bruce & Cook	488	88,718
E. S. Wheeler & Co.	378	8,249
N. L. Cort & Co.	225	97,103
Hy. Whittemore & Co.	183	46,476

Metals.

	Pounds.	Pounds.
Tin: R. Crooks & Co.	582,464	1,348,980
American Metal Co.	280,452	2,988,823
Muller, Schall & Co.	224,512	10,175,413
Phelps, Dodge & Co.	112,000	2,202,557
Jas. E. Pope, Jr.	56,062	450,750
Naylor & Co.	56,128	2,878,159
D. Thomsen & Co.	22,465	271,867
A. A. Thomsen & Co.	22,264	188,993
Lehman, Sons & Co.	14,681	116,715
Jas. Davol & Son	14,025	14,025
Antimony: Edw. Hill's Sons & Co.	150	1,500
Dickerson, Van Dusen & Co. Hendricks Bros.	34	85
	34	236

Hardware, Machinery, &c.

Barbour Bros. & Co., Mach'y, pkgs., 4	
Boker, Hermann & Co., Arms, cs., 8; Mdse., cs., 58	
Crabb, William, Mach'y, cs., 7	
Degrauw, Aymar & Co., cables, cs., 6; do., 11	
Field, Alfred & Co., Mdse., cs., 100	
Foley, Edward, Mach'y, cs., 18	
Folsom, H. & D., Arms, cs., 7	
Fuch & Lang, Mach'y, cs., 10; ditto, pkgs., 12	
Frasse, P. A. & Co., Mdse., cs., 6	
Graef Cutlery Company, Cutlery, cs., 4	
Hartley & Graham, Mdse., cs., 10	
Haynes, C. A. & Co., Hardware, bxs., 15	
Kern, G. & Co., Mach'y, cs., 1	
Merch. Desp. Company, Hdw., cs., 2	
Schoverling, A., Mdse., cs., 27	
Schoverling, Daly & Gales, Arms, cs., 37	
Sheldon, G. W. & Co., Hdw., cs., 17	
Singer Sewing Machine Company, Machines, cs., 17	
Spacter, Case, Ironware, rolls, 2787	
Sheebane Bros., Mach'y, pkgs., 5	
Thebaud Bros., Mach'y, cs., 21; ditto, pieces, 50; ditto, pkgs., 18	
Ward, J. E. & Co., Mdse., cs., 27	
Wiebusch & Hilger, Lim., cs., 9	
Witte, John G. & Bro., Cutlery, cs., 3	
Order, Hdw., pkgs., 19; ditto, cs., 4; Mach'y, cs., 12	

Irons and Metals Warehoused from November 2 to November 9, Inclusive:

Lead: Schultz & Ruckgaber..... Pounds. 799,060

Exports of Metals.

	Nov. 2 to Nov. 9. Pounds.	Jan. 1 to Nov. 9. Pounds.
Copper: J. Abbott & Co.	1,318,500	12,632,580
Lewisohn Bros.	43,750	4,041,522
F. A. Lomal		2,581,233
American Metal Company ..	25,000	5,991,862
G. H. Nichols		223,939
J. Bruce Ismay		112,000
S. Mendel		500,000
Ledoux & Co.		110,276
Muller, Schall & Co.		430,000
Copper Queen Con. M. Com- pany		224,084
J. Kennedy, Tod & Co.		112,028
H. Becker & Co.		1,250
Orford C. & S. Rfg. Company ..		449,881
Robt. M. Thompson		125,000
Thos. J. Pope, Sons & Co.		1,451,130
Williams & Terhune		99,320
J. Parsons & Co.		430,000
Naylor & Co.		448,809
Bridgeport Copper Com- pany		112,000
C. Herold		250,000
Phelps Bros.		6,250
R. W. Jones		189,984
Ladenburg, Thalmann & Co.		229,371
W. H. Crossman & Bro.		4,000
R. Crooks & Co.		1,000
Copper Matte: Williams & Terhune	230,000	36,558,744
Lewisohn Bros.		3,021,610
American Metal Company ..	436,384	4,516,988
J. Abbott & Co.		337,447
C. Ledoux & Co.		999,900
F. W. J. Hurst		184,288
G. H. Nichols		722,777
H. T. Nichols & Co.		180,996
Kunhardt & Co.		41,652
Lead: Joseph Gillet	453,174	453,174

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, NOV. 14, 1888.

Speculative interest in the Copper market has been comparatively moderate the past week. Operators are hesitant pending some new move on the part of the "syndicate" agents that would serve as a cue to future operations, and the masters of the situation afford no gratification to the desire for new features. Their doings in the open market are of a commonplace character at the present time and nothing new is divulged regarding the latest negotiations with the mining companies. Meanwhile prices for Chili Bar and G.M.B. contracts are maintained, while those of furnace material have been advanced 6d. Anaconda Matte is now held at 16/ at Liverpool.

Block Tin has been devoid of speculative animation. Purchases are restrained in some degree by a fear that heavy shipments from the East may be started suddenly and, on the other hand, the position of supplies here causes more than ordinary caution in "bear" operations.

The market for Tin Plates has under-
gone no decided change. Buyers and

sellers are still considerably apart on prices, and, while concessions have been made in some instances, the reduction was not great enough to stimulate business. The stock at British shipping ports is estimated at 193,000 boxes, against 156,000 a year ago and 191,000 boxes last month. The exports to the United States during October were 24,492 boxes, against 25,483 the previous month. The Burry Tin Plate Company's Works are enlarged.

Speculation in Pig Iron "warrants" has moderated, both "bulls" and "bears" having temporarily suspended aggressive work, pending new developments. There is a fairly good consumptive demand, but the foreign demand has fallen off considerably. Prices have undergone but slight changes the past week. In the Manufactured Iron and Steel branches the situation is practically the same as a week ago. The exports of Pig Iron to the United States last month were 11,000 tons, against 12,400 tons in September. There have been more inquiries for Old Iron Rails, but holders ask higher prices, and that checks business.

Scotch Pig.—The market has been rather quiet and prices show only slight change, although rather weak.

No. 1 Coltness, f.o.b. Glasgow	49/
No. 1 Summerlee, "	49 1/2
No. 1 Gartsherrie, "	47/
No. 1 Langloan, "	48 1/2
No. 1 Carnbroe, "	43 1/2
No. 1 Shotts, " at Leith	48 1/2
No. 1 Glengarnock, " Ardrossan	47 1/2
No. 1 Dalmellington, "	47 1/2
No. 1 Eglinton, "	41 3/4

Steamer freights, Glasgow to New York, 6/6
Liverpool to New York, 10/.

Cleveland Pig.—A moderate business the past week, and prices barely steady. No. 1 Middleboro', G.M.B., 37/; No. 3 do., 34/8 @ 34/6.

Bessemer Pig.—Buyers are taking hold indifferently and prices are merely steady. West Coast brands, mixed numbers, 45/, f.o.b. shipping point.

Spiegelstein.—There is still a fairly active demand and prices are firm. English 20% quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—The demand continues quite brisk and the market very firm. Standard English sections quoted at £3. 18/9, and light sections £4. 2/6 @ £4. 7/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—Demand continues moderate, but makers are very firm on prices. We quote £4 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—For these there is still a good demand and former prices prevail. Bessemer, 2 1/2 x 2 1/2 inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—The demand is moderate, but makers offer indifferently and are very firm on prices. Bessemer, £4, f.o.b. at N. W. England shipping point.

Scrap Iron.—Demand continues moderate and prices are unchanged. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Old Rails.—The demand fair. Holders very firm and too high for business. Tees quoted at £3. 5/, and Double Heads £3. 10/, c.i.f. New York.

Crop Ends.—The market quiet and prices unchanged. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—There has been a fair business, but prices are irregular. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/	@ 15/
IC Bessemer steel, Coke finish.....	13/8	@ 14/
IC Siemens.....	13/8	@ 14/
IC Coke, B. V. grade.....	13/8	@ 13/
Charcoal Terne, Dean grade.....	12/	@ 12/

Manufactured Iron.—The volume of business is satisfactory, and prices are very firm. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars.....	£ s. d.	£ s. d.
Common.....	@ 8 2 6	
Staff. Bk Sheet, singles.....	@ 5 10 0	
Welsh Bars (f.o.b. Wales).....	5 0 0	@ 5 2 6

Tin.—A fairly active business at somewhat lower prices. Straits quoted at £101, spot, and £101. 15/ for three months' futures.

Copper.—The market quiet and prices without material change. Chili Bars, £78. 7/6, spot, and £79, three months' futures. Best Selected, £82.

Lead.—A quiet market, and prices rather weaker. Soft Spanish, £13.

Spelter.—Prices quite steady, but the market very quiet. Silesian, ordinary, £18. 15/.

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira.....	Cents.
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Escudo (Portugal).....	11.08
Milreis (Brazil).....	54.6
Mark (Germany).....	23.8
Kilogram.....	Pounds.
Pical.....	2.205
	134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, October 12, 1888.—*Asphaltum.*—The demand has continued steady at \$14.04, Boiled, 3/ ton, and \$6.84, Crude, f.o.b., inclusive of export duty. Exportation from January 1 to date has reached 42,947 tons, against 34,041 last year and 32,175 in 1886. *Exchange*, 90 days' sight, on London, \$4.80 @ \$4.86.—*E. P. Masson.*

BRAZIL.

PARA, November 9, 1888.—*India Rubber.*—Our market has been stiffening, with no accumulation of supplies. There are now afloat hence for the United States altogether 490 tons, and the next steamer will leave toward the close of the month.—*Per cable direct.*

EAST INDIES.

MANILA, November 5, 1888.—*Hemp.*—Has been quiet during the week at \$11.12 1/2 3/4 picul, against \$10 same time last year, equaling 3/ ton cost and freight £38. 7/6, against £38. 7/; the clearances for the United States since last cable have been none, against 32,000 bales last year; since January 1, 184,000, against 222,000; loading for do. 42,000, against 24,000; cleared for England since January 1, 285,000 bales, against 185,000; loading for do., 9000, against 13,000; cleared for other countries, 61,000, against 56,000; receipts at all ports since last cable, 24,000, against 9000, and since January 1, 556,000 bales, against 452,000 last year and 343,000 in 1886. *Freight*, \$7, against \$5.50. *Exchange*, 3/7, against 3/8 1/2. —*Ker & Co. to Mr. Charles Nordhaus, their agent, 89 Water street, New York, per cable direct.*

SINGAPORE, November 19, 1888.—*Tin.*—The shipments from the Straits Settlements to the United States in October have amounted to 750 tons, against 100 same month last year, and to England to 2000, against 2500; since January 1 they were, respectively, 2950, against 4100, and 15,700, against 12,500, aggregating during the ten months 16,650, against 16,600.—*Giffilan, Wood & Co., to Mr. Charles Nordhaus, 89 Water street, New York, their agent.*

COLOMBO, CEYLON, October 20, 1888.—*Plumbago.*—There is a continued scarcity of prime quality, which still tends upward. We quote at the close, in rupees, 3/ ton: Large Lumps, 145 @ 170; Ordinary Lumps, 125 @ 160; Chips, 80 @ 95, and Dust, 40 @ 65. Shipments for the twelvemonth to October 1, 1888, have been distributed as follows: To England, 78,066 cwt.; to Marseilles, 38; to Trieste, 523; to Hamburg, 12,594; to Antwerp, 6248; to Bremen, 2012; to India, 82, and to the United States, 154,469, together 254,027, against last year 238,820; 196,153 in

1886, and 197,221 in 1885. *Coir Yarn.*—Nos. 1 to 4 have been steady at 7 @ 12 rupees 3/ cwt. *Exchange*, six months' sight, 1/4 1/2.—*Volkart Brothers, represented by Mr. John W. Greene, 82 Wall street, New York.*

SOUTH AFRICA.

CAPE TOWN, CAPE OF GOOD HOPE, October 1, 1888.—*Diamonds.*—The five diamond mines' output in 1887 has been as follows:

	Carats.	
Kimberley.....	1,333,833	£1,420,207
De Beer.....	1,014,048	1,022,878
Dutoitspan.....	696,576	987,284
Bultfontein.....	602,246	612,963
St. Augustine.....	194	250

Totals..... 3,646,897 £4,033,582
Being an increase of.. 463,869 737,714

over 1886. The export has been as follows:

	1887.	
Carats.....	3,598,980	£4,242,470
	1886.	
Carats.....	3,135,061	£3,504,756
Increase carats.....	463,869	737,714

or 20 %.—*Argus.*

SWEDEN.

STOCKHOLM, November 1, 1888.—*Iron Ore.*—Up to October 19, 32 steamers had loaded at the Lulea mines 57,700 tons of ore, and 4 were still loading, probably the last this year. Mining has been slackening; the weather has become so cold that miners have left in great numbers, both Lulea and Gellivara. The Lulea-Ofoten Railroad Company has been compelled to pay the full duty on its imported rolling stock.—*Dagbladet.*

GERMANY.

HAMBURG, November 3, 1888.—*Iron.*—A livelier demand for Pig is noticeable in Rhenish-Westphalia; the September output in Germany and Luxembourg is shown to have been 353,812 tons, against 337,638 in 1887, 172,028 tons being Forge and Spiegel, 34,745 Bessemer, 102,900 Thomas and 44,139 Foundry. During the first nine months the output was 3,168,641 tons, against 2,849,491 last year. The American and other demand for Spiegel has been very active, and prices remain firm at 53 marks 3/ ton for 10 to 12 % Manganese. Forge Pig has been moderately active at 47 @ 48 at Siegen; Thomas is as much wanted as before; Bessemer neglected; Foundry has remained steady at 53 @ 59; English do. is quoted 44/6 or the West Coast; Luxembourg is weak, because stock accumulates; White is quoted 37.25 and Gray 43.50; Merchant is neglected for domestic use, but more saleable for export. There are orders to be filled for the last quarter of the year. The general outlook in the German Iron trade is looked upon as encouraging; it is a good sign that the South German makers cling to the Rhenish-Westphalian syndicate. Hoop Iron, while selling more readily at home, is but little inquired for for export. Boiler Plates move off even more rapidly than before; Thin Sheets are looking up but slowly. The Wire branch is still partially unsettled since the dissolution of the Wire Nail syndicate. Foundries, machine shops and car works still report favorably. The closing quotations at Dortmund are: Merchant Iron, 125 @ 127.50; Hoop Iron, 127.50; Boiler Plates, 170; Tank Sheets, 150; Thin do., 147 @ 150; Steel do., 160; Axles, Complete, 315; Loose do., 230; Hoops, 215 @ 230; Steel Rails for mines, 115. In Upper Silesia there is no abatement in the Pig Iron demand, nor in that for Steel Bessemer and Martin Billets; this relates equally as much to Plates and Sheets and the Wire branch for spring delivery. Higher prices are insisted upon for forward delivery. *Metals*—are sustained as follows: Lead, German, 14.50 @ 15 marks 3/ 50 kg; Copper, Lake, 79 @ 80; Spelter, 18 @ 19; Zinc, Gray, 20 @ 22; do., White, 21 @ 22, and Tin Salt, 50 @ 85d. the 1/2 kg.—*Borsenhalle.*

SPAIN.

BILBAO, October 27, 1888.—*Iron Ore.*—Sales for the week have been limited to a few single cargoes at 7/ @ 7/3 Rubicos, and 8/ @ 8/3 Campanil. Steamers continue scarce, but soon navigation in the North of Europe will close and they will not be wanting. Stocks of Ores are liberal. The shipments since January 1 aggregate 3,081,443 tons, against 3,620,657 in 1887. *Pig Iron.*—Exportation during the week amounted to 1351 tons, and coastwise shipments to 1322 tons.—*Bilbao Maritimo y Comercial.*

The report that the new pipe mill of the Reading Iron Works, at Reading, Pa., had closed down for an indefinite period is without foundation. The mill was shut down on Wednesday, the 7th inst., and on account of the lack of certain sizes of iron.

The same has since been received, and the mill started up on the morning of the 12th inst., with a full complement.

The Gilbert Plow Company, of Wichita, Kan., have recently completed and put in operation a very large plow factory. The organization of the company dates back but a year. Their capital is \$200,000, and their factory is one of the best-equipped in the country. Most of the heavy machinery was made by Williams, White & Co., of Moline, Ill., and is of the latest and most approved designs. The buildings are of brick and one story in height. The main building is 70 x 300 feet, containing the forges, bending machines and wood-working machinery. The main warehouse is 70 x 200 feet. Smaller buildings have been erected for special purposes. The whole arrangement is upon a plan which permits of enlargement whenever that may be deemed necessary. The entire machinery is operated by a 150 horse-power Cooper-Corliss engine, built at Mount Vernon, Ohio. The boiler is capable of 200 horse-power. The superintendent of the works is Isaac R. Gilbert, who has had long experience in the manufacture of plows, having been superintendent of the Avery Plow Works, at Louisville, Ky., for five years, as well as similarly employed at other factories. The new company are making a specialty of a plow which Mr. Gilbert has invented and for which he claims many advantages not only over other inventors' plows but over designs which he has himself put forth that met with popular favor. The new plow has three wheels. The mold board share and land side are made of wrought steel, and can be lifted entirely clear of the ground in transportation, having a raise of 8 inches when not in use and a depth of 14 inches in the furrow. The clevises are constructed so that the depth of cut can be regulated without separating the team from the plow. A short corner can also be turned with this plow without its leaving the ground. The favor with which this plow has been received is proved by the large orders which have been sent in for it.

The Dominion Government awarded the contract for the construction of the Sault Ste. Marie Canal, amounting to \$1,200,000. Associated with the Canadian contractors is a firm at Watertown, N. Y. The Canadian Government will be entirely independent of the canal built by the United States at the same place.

The Springfield Glue and Emery Wheel Company, Springfield, Mass., have recently received, they advise us, 40 tons of garnet and have 50 tons more on the road. This substance is brought from a mine in Minerva, N. Y., that the company recently bought, about eight miles from the Adirondack railroad. The purchase covers 32 acres, and as the strip is bounded on one side by the public highway it is easily accessible. The rock is described as very hard, and when crushed each particle has very sharp edges, so that for cutting it is superior to ordinary sandpaper. As the mine is a large one and will last for years it is regarded as an important find for the company and will largely increase their facilities.

The extensive works of the Steam Gauge and Lantern Company, in Rochester, N. Y., were destroyed by fire on Friday night, and at least 20 persons lost their lives, quite a number having leaped from the windows of the building, which was a seven-story brick structure, owned by W. H. Gorsline. The pecuniary loss is placed at \$250,000.

Hardware.

Our advices indicate an improved condition of business, which promises to be fair during the remainder of the season. There is very little revision of quotations, and prices remain exceptionally steady. Collections are generally reported fair.

Cut Nails.

This market is less demoralized. During the past few weeks spasmodic efforts have been made by weak sellers to market goods, and \$1.75 has been named. It is claimed that the mills referred to are not longer pressing. We quote \$1.80 to \$1.90 for carload lots of Nails, and \$1.90 to \$1.95 for small lots from store.

Wire Nails.

The general situation remains as before, quotations continuing steady at \$2.65 for small lots and \$2.55 for carloads.

Barb Wire.

Considering the season, there is a fair demand and prices continue without material change. The Eastern market is in a better condition than the Western, though there is some irregularity in quotations. The following are the regular New York quotations for Four-Point Galvanized, with delivery: Carloads, 3.6 cents; 3-ton lots, 3.7 cents; less than 3 tons, 3.9 cents. It is to be observed that the quotations given in our last issue were for Wire in this city without delivery, and hence were lower than those given above.

Sandpaper.

As the trade have from time to time been advised in these columns, there has been during the last year or two a good deal of irregularity in the Sandpaper combination, and the goods have been sold in a covert way at prices lower than the arrangements between the manufacturers contemplated. In consequence of this condition of things Herman Behr & Co., 75 Beekman street, New York, have withdrawn from the combination, as per the following announcement, which was made on Tuesday:

We take pleasure in informing our customers and the trade generally that we have severed our connection with the Association of Sandpaper Manufacturers of the United States, and shall be pleased to quote prices and discounts upon application.

The trade will recognize the importance of this action, Herman Behr & Co. being an influential house of high standing, largely engaged in the manufacture of Ruby, Sand and Emery Papers, Glue, &c., and Mr. Behr having been the president of the association. They are intending to give increased attention to the manufacture of goods required by the Hardware trade, which, in connection with their other lines, they are prepared to manufacture to advantage. They announce a discount of 35 to 40 per cent. to the general trade, which will be recognized as a material concession beyond prices which have heretofore been within the reach of retail buyers.

In this condition of things the Sandpaper market is in an unsettled state. There appears to be no prospect of an immediate restoration of prices recently ruling, and it is thought not unlikely that somewhat lower quotations will be developed in the course of the competition for business which is likely to follow the breaking up of the combination.

Miscellaneous Prices.

The advanced prices for Rope which we have referred to as likely to be announced are now ruling, an advance of $\frac{1}{4}$ cent per pound having been made since our last issue. This advance applies to both Manila and Sisal, the market being firm and regular at the new prices. Manufacturers' prices for good lots are as follows, subject to a discount of $1\frac{1}{2}$ per cent. for cash in ten days:

Manila, $\frac{1}{8}$ inch and larger.....	12	cents per lb
Manila, $\frac{3}{8}$ inch.....	12 $\frac{1}{2}$	" "
Manila, $\frac{1}{2}$ and 5-16 inch.....	13	" "
Manila Tarred Rope.....	11 $\frac{1}{2}$	" "
Manila Hay Rope.....	12	" "
Sisal, $\frac{1}{8}$ inch and larger.....	10	" "
Sisal, $\frac{3}{8}$ inch.....	10 $\frac{1}{2}$	" "
Sisal, $\frac{1}{2}$ and 5-16 inch.....	11	" "
Sisal Hay Rope.....	10	" "
Sisal Tarred Rope.....	9 $\frac{1}{2}$	" "
Sisal Medium Lath Yarn.....	9	" "

The recent advance made on Skates by P. Lowentraut, Newark, N. J., for whom James Forsyth, 116 Chambers street, New York, is agent, was 20 cents on Nos. 1 to 8, and 25 cents on all other numbers.

The following is the price list of Foster Bros., Fulton, N. Y., manufacturers of Butcher Knives, Cleavers, &c. The list prices given on Knives are subject to a discount of 40 per cent., and those on Cleavers to a discount of 30 per cent.

Market Cleavers.		Per doz.
Size.		
7 Inch Cutting Edge.....		\$15.00
8 " " ".....		17.00
9 " " ".....		20.00
10 " " ".....		23.00
12 " " ".....		28.00

Lamb Cleavers.		Per doz.
8 Inch Cutting Edge.....		\$10.00
9 " " ".....		11.00
10 " " ".....		12.00

Lamb Splitting Knives.		
No. 1.		
12 Inch.....		\$20.00
14 Inch.....		22.00

No. 2—Light.		
12 Inch.....		\$17.00
14 Inch.....		19.00

Choppers—Wood Handle.		
7 Inch Cutting Edge.....		\$14.00
8 " " ".....		16.00
9 " " ".....		18.00
10 " " ".....		21.00

Pork Cleavers for Packing House Use—Iron Handle Wound.		Each.
20 Inch Cutting Edge.....		\$6.00
22 " " ".....		7.00
24 " " ".....		8.00

Beef Splitters.		Per doz.
12 Inch Cutting Edge.....		\$24.00
13 " " ".....		27.00
14 " " ".....		32.00

Family Cleavers.		
8 Inch Cutting Edge.....		\$10.00
Butcher Knives—Beech Handle.		
5 Inch Cutting Edge.....		\$2.40
5 $\frac{1}{2}$ " " ".....		2.70
6 " " ".....		3.00
6 $\frac{1}{2}$ " " ".....		3.50
7 " " ".....		4.00
8 " " ".....		5.20
9 " " ".....		6.40
10 " " ".....		8.00
11 " " ".....		9.60
12 " " ".....		11.70
13 " " ".....		13.20
14 " " ".....		16.80

Skinning Knives—Advance 1 inch.		
Butcher Steels.		
10 Inch.....		\$7.50
12 " " ".....		9.60
14 " " ".....		12.40

Scrapers.		
All Iron.....		\$12.00
Wood Handle.....		10.00

Parting Knives.		
3 Inch Cutting Edge.....		\$1.00
Masticator.		
No. 1.....		\$12.00

Sidney Shepard & Co., Buffalo, N. Y. have recently added a 12-quart Galvanized Iron Pail, which is sold at \$3 per dozen, to the line of 12 and 14 quart Pails which they have heretofore been making.		
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Horton, Gilmore, McWilliams & Co., Chicago, Ill., issue a holiday catalogue in pamphlet form, in which 48 pages are devoted to Cutters, &c., Chairs, Desks,		
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Tables, Rocking Horses, Toy Wagons, Perambulators, Velocipedes, &c. They also call attention to a Five-Bottled Silver Plated Caster, which is sold at \$1.60		
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The combination on Carriage Bolts is generally referred to as working very satisfactorily, and for the most part prices are strictly maintained by the manufacturers. There are, however, some exceptions.		
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The following is the price list of Scroll Saw Blades manufactured by W. F. & John Barnes Company, Rockford, Ill. It is subject to a discount of 35 per cent.:		
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Length.	Per	Length.	Per
In. Width.	doz.	In. Width.	doz.
5.. 1-16 to 3-16.....	\$0.60	22.... $\frac{1}{4}$ to $\frac{3}{4}$	\$2.75
7.. 1-16 to $\frac{1}{4}$.....	.75	24.... $\frac{1}{4}$ to $\frac{3}{4}$	2.95
10.. $\frac{1}{4}$ to $\frac{1}{2}$	1.50	26.... $\frac{1}{4}$ to $\frac{3}{4}$	3.30
12.. $\frac{1}{2}$ to 5-16.....	1.60	28.... $\frac{1}{4}$ to $\frac{3}{4}$	3.60
14.. 3-16 to 5-16.....	1.80	30.... $\frac{1}{4}$ to 1.....	3.90
16.. 3-16 to $\frac{3}{4}$	1.95	32.... $\frac{1}{4}$ to 1.....	4.40
18.. $\frac{3}{4}$ to $\frac{1}{2}$	2.35	34.... $\frac{1}{4}$ to 1.....	4.75
20.. $\frac{1}{2}$ to $\frac{3}{4}$	2.60	36.... $\frac{1}{4}$ to 1.....	5.00

The Diamond Wrench and Tool Company, Portland, Me., whose organization is referred to on page 750, advise us that they have adopted Coes' List and quote discount 55 per cent., 60 days, with 3 per cent. discount for cash in ten days. We give below the sizes, openings and contents of cases:		
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Size Wrench. 5 6 7 8 10 12 15 18 21 in		
Will open.... $\frac{3}{8}$ $1\frac{1}{8}$ $1\frac{1}{4}$ $1\frac{1}{2}$ $1\frac{3}{4}$ $2\frac{1}{8}$ $2\frac{3}{4}$ 3 $4\frac{1}{4}$ "		
Case contains 6 6 6 6 6 6 3 2 1 doz.		

In the description given in our last issue of King's Sash Support and Bolt the address of the manufacturers was not given. This article is made by the Palmer Hardware Mfg. Company, Troy, N. Y., who are also putting on the market King's Bit Gauge.		
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Items.		
The George Worthington Company, Cleveland, Ohio, have issued their circular of fall and winter goods. It is devoted to Stove Boards, Coal Hods, Elbows, Vases, Sleigh Bells, Skates, Snow Shovels, Fire Irons, Lamps and a variety of other seasonable articles, of which an interesting line is shown. The catalogue is well and compactly arranged, showing a varied line in comparatively small space. Their Gun catalogue illustrates some leading Arms and Ammunition, with Gun Implements and specialties in this line. It also calls attention to the completeness of their stock of General Hardware, Tinnery's Supplies, &c.		

The following changes have recently been made in the management of The Union Hardware Company, Torrington, Conn. George B. Farrell, for many years president, has resigned, and A. F. Midgeon, who organized the company in 1864, has been elected in his place. Thomas W. Bryant becomes secretary and agent. Improvements to the plant have already commenced and the new manager announces that they propose to add to the business as rapidly as possible.		
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Horton, Gilmore, McWilliams & Co., Chicago, Ill., under date of November 10, issue a price current in which Sleigh Bells, Chimes, &c., are given a prominent place. Skates, Snow Shovels, Hand Sleds, with Decorated Pearl Agate Ware, Clocks, Coal Vases and various specialties, are shown.		
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Silver & Co., 56 Warren street, New York, issue a sheet in which their household specialties are represented. It includes a variety of new and ingenious articles.		
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Blish, Mize & Silliman, of Atchison, Kan., wholesale Hardware merchants, are contemplating the abandonment of Cut Nails as part of their regular stock. They state that for some considerable time two-thirds of their Nail sales have consisted of Wire Nails. This firm employ six travel-		
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ing men, and report a much more active demand during the past 30 days than earlier in the year. Their business was to some extent affected by the failure of crops in Central and Western Kansas. The trade of their territory is briskly competed for by the Chicago, St. Louis, Kansas City and St. Joseph wholesale merchants. In addition to their wholesale business this firm have a very large retail trade.

The catalogue of the Hulbert Fence and Wire Company, St. Louis, Mo., represents a variety of Fencing and Wire Goods. A description is given also of Hulbert's Patent Wire Netting and Picket Fence Field Loom.

E. N. Hatcher, Columbus, Ohio, issues a catalogue of the Columbus Steel Thimble Skein Works, which are referred to as the largest and most complete in the world for the manufacture of Thimble Skeins. The plant covers 4 acres of ground. The different patterns are represented and list prices given.

The circular of Ice Creepers manufactured by L. A. Sayre, Newark, N. J., illustrates the Rival, the Climax, the Security, the Eclipse, the Instep and the Sure Foot.

The Iron City Mfg. Company, South Pittsburgh, Tenn., announce that they have purchased the plant for manufacturing Hot-Pressed Nuts, also the entire stock of manufactured goods, from George C. McMurtry. In continuing the manufacture they intimate that they propose to maintain the high standard of quality on this brand of Nuts, and further state that they will give the lowest prices consistent with good quality and quantity.

H. H. Mansfield, at 36 Pine street, New York, has engaged in the business of furnishing Railway, Mill and Manufacturers' Supplies, new and second-hand. Mr. Mansfield was with Barrows & Co., a well-known supply house, for a number of years. On Mr. Barrows' death the business of the firm was discontinued, and Mr. Mansfield has now started for himself as above.

H. S. Jackson & Co., Nashville, Tenn., have recently completed arrangements by which they are granted exclusive sales agency for the output of the Sequachee Hoe and Tool Company, at South Pittsburgh, Tenn., manufacturers of Eye Hoes, Picks, Mattocks, Grub Hoes, &c. They make special reference to the quality of their Eye Hoe, and intimate that they are prepared to meet prices from other manufacturers.

The Scranton Mfg. Company, Chicago, Ill., announce that the appointment of the Moore Mfg. Company as general selling agents for their line of Hangers has been withdrawn, and that hereafter the trade will be supplied direct from the factory. They also state that they are in better condition now than ever to give prompt delivery and to quote close prices, and allude also to the merit of their Hangers.

On page 68, in the announcement of F. A. Tyler, 128 W. Dominick street, Rome, N. Y., an illustration is given of his Patent Flour Receptacle and Sifter. This article is shown in two positions, one indicating the manner of its use, and the other explaining its construction and the way especially in which the Sieve is attached. This Receptacle and Sifter is referred to as exceedingly convenient for household use, and is made in two sizes, to hold a 25 or a 50 pound sack of flour.

The St. Louis Expanded Metal Company, St. Louis, Mo., issue an interesting pamphlet explaining what their Expanded Metal is and the uses to which it is put. The pamphlet is copiously illustrated with cuts showing the different meshes in which the Expanded Metal is offered and

its adaptation for fences, aviaries, screens and many uses for which netting is generally utilized. It is interesting as showing the extent to which this new line of manufacture is being developed.

In the description which was given in our issue of November 1, the address of the Lowell Wrench Company was incorrectly given as Lowell, Mass., instead of Worcester, Mass. The trade will please note the correction.

A. J. Harwi, of Atchison, Kan., is a wholesale and retail heavy Hardware merchant. He carries a full stock of Farming Implements, from Threshing Machines to the simplest Tools, Wagons, Wagon Materials, Chains, Shelf Goods, and Bar Iron and Steel. He has excellent ideas as to the arrangement of stock. His manner of handling Rope is as follows: The spools of Rope are placed on a hanging shelf in the basement of the store. The ends are then drawn up through holes in the floor and hung over hooks in the adjoining wall. When a customer calls for a piece of Rope the required length is drawn up, measured, cut off, and the end again hung on the hook, thus saving space in the store-room, as well as securing other obvious advantages.

Charles Monk, 190 Sixteenth street, Brooklyn, N. Y., issues a neat and convenient descriptive price list of the line of Molder's Tools, of which he is manufacturer. Cuts are given of the Tools with dimensions and list prices.

Louis Ernst & Son, Rochester, N. Y., dealers in Mechanics' Tools and Builders' Hardware, announce that soon after January 1, 1889, they will remove to Nos. 129 and 131 East Main street.

Owing to the recent death of Martin Fechtman, the copartnership heretofore existing under the firm name of Fechtman & Gade is dissolved. William F. Gade, surviving partner, will continue the business at the old stand, 205 Canal street, New York, where he will carry a line of Cabinet Hardware, Tools, &c., as heretofore.

The Joliet Iron and Brass Foundry Company, Joliet, Ill., manufacturers of patent malleable iron Furniture Casters, have appointed John H. Graham & Co., 113 Chambers street, New York, general agents for the sale of these goods, who will carry a stock for the convenience of the trade, and will be prepared to fill orders promptly at the lowest market prices.

Through the daily papers the trade have learned of the disastrous fire in the factory of the Steam Gauge and Lantern Company, Rochester, N. Y., on the 9th inst. In spite of the efforts that were made to check the fire and rescue the occupants the factory and its contents were totally destroyed, and with a lamentable loss of life. The company announce that rebuilding and equipping of the new factory will commence at once, and they state that the stocks of goods in their New York and Chicago stores will enable them to fill orders with promptness. They solicit the further orders of the trade, with the suggestion that as much time as possible be allowed for their execution.

Wire Goods Company, Worcester, Mass., are about to issue to the trade a new and very complete catalogue of their large and increasing line. It is probably the largest and most complete line of strictly Wire Hardware that is offered to the trade. The company have four different factories located in different sections of the city, and their products are divided into the Wire Nail department, General Hardware department, House-Furnishing Hardware and Novelties and Tack and Staple de-

partment. They have largely increased their plant from time to time and have bought up and absorbed a number of concerns, including Caswell, Converse & Co., Taunton, Mass., the Worcester Tack and Staple Company and the Ayres Mfg. Company, together with several other smaller houses. The catalogue, which contains 122 large, well printed pages, relates to Bright Wire Goods, Staples, miscellaneous household specialties, Mouse Traps, Muzzles, Tacks and Staples, Escutcheon Pins and standard and miscellaneous Wire Nails. It is to be observed that the catalogue puts several lines of Hardware and Wire into better and more systematic shape than that in which they are usually presented, with such arrangement and description of the goods as regards numbers and classification as will tend to obviate the confusion that has sometimes resulted. The company have recently added the Universal Chain, which is described on page 52, to which they refer as so thoroughly flexible and universal that it is adapted to a large variety of uses, and it is thought by them that it will meet with a large sale. The whole catalogue is very complete and will be appreciated by the trade.

Peter Gerlach & Co., Cleveland, Ohio, issue a price list showing an exceptionally large and complete line of Ice Tools, of which more than 50 articles are represented. In their circular relating to their manufactures they refer to their experience of 14 years, the extent of their plant, and its equipment with requisite machinery for the manufacture of their goods. The excellence of the material used and the quality of the workmanship are emphasized.

Business Tendencies.

We print below extracts from a number of letters from Hardwaremen in the localities indicated, in which they discuss the question as to the tendency of the trade toward direct dealings with the manufacturer. It will be seen that many of our correspondents refer to the important position occupied by the jobbers, and the advantage for the small dealer in purchasing from them on account of being able to procure the goods promptly and in such quantities as are required by their trade. The disposition on the part of the larger retailers to purchase direct from the manufacturers is also referred to, as well as the increased activity and enterprise of the manufacturers in seeking this class of trade.

Helena, Mont.—We find it to our interest to deal directly with manufacturers, and are gradually placing our trade in that way. We think other houses here are doing the same.

Amsterdam, N. Y.—It is our opinion that the table of Fred. P. Straub & Co. is a fair indication of the drift of trade. We think, however, that the smaller dealers are more loyal to the jobbers and will continue to be so, than the larger dealers, and that a table furnished by the small dealer would make an opposite showing, which would be in favor of the jobber. It is evident that if the jobbers are not holding their own it is the desire of the manufacturer that they should not, for reasons that are best understood between jobber and manufacturer. It has occurred to us that the manufacturers are uneasy and are desirous of and court direct dealings, and if this is so and they make it agreeable to the retailer, as they do, the retailer will give the manufacturer the preference. We speak only in a general way and will allow exceptions.

Watertown, N. Y.—I never have kept a record of my purchases as to proportions bought from jobber or manufacturer, but my purchases are now and always have been mostly from the manufacturer.

Shakopee, Minn.—If manufacturers would sell goods without protecting the jobber it would be good policy to buy of them if they would always be willing to sell in quantities to suit. But they will not. Then another thing; where is the manufacturer that makes a full line of Hardware? I think that the jobber is a necessity to the small purchaser. He can get all goods necessary in one stock by buying from the jobber. By buying of the jobber we give

employment to a large number of men. I believe in living and let live. If a retail buyer is large enough he might make a saving to some extent by buying direct.

Perham, Minn.—Regarding the purchase of goods from manufacturer and jobber, we can safely say 80 per cent. of the goods used in central and northern Minnesota are bought from Western Jobbers.

Wellington, Kansas.—The general tendency of the retail trade is toward buying direct from the manufacturer, and the only reason why more goods are not bought direct is because it takes so long to get them.

Stillwater, Minn.—We do not believe the jobber is gaining on the maker. We are visited every year by more and more agents of manufacturers in lines in which we have heretofore dealt only with jobbers, and when we can swing the requisite number of goods we find it to our advantage to deal direct, and the manufacturer often makes it so, even if we do not need half the jobbing quantity. There are several lines that we have dropped buying of the jobbers for years, and our trade is growing more direct, especially with the manufacturer's agent, who carries a stock where we can get them within 50 hours after ordering them. On seasonable goods we find it best to contract with manufacturers for the amounts we want. We can at least buy them on as good terms as from the jobbers, and then we are more certain of the quality and the time we will receive them.

Ft. Madison, Iowa.—We are of the opinion that the bulk of Hardware is sold through the jobber, at least, in our own case. We prefer to buy from the jobber—firstly, because we can buy in such quantities as our trade demands, and, secondly, a good buyer if he wants a round lot of a certain line of goods has only to state it to his jobber and a satisfactory price will at once be made to him, and when Eastern freights are taken into consideration the jobber has done him the most good. As regards buying from manufacturers' agents, there is very little of that done among the retailers. The facts are that the retailer does not receive one call from the manufacturer or his agents where he receives 25 from the jobber. Hence he gets out of the habit of thinking of buying from first hands, and it is well he does, for he would be forever overstocking himself from the manufacturer, while from the jobber he buys just what he wants. In our opinion the jobbing business is on the increase and the manufacturers' business is being more closely confined to the wholesale trade.

Washington, D. C.—We do more business direct now than ever before, and think, so far as our city is concerned, this is general.

Indianapolis, Ind.—Our impression is that manufacturers are gradually undermining the jobbers, and, although our business is larger than ever before, it is only kept so by constant attention, and by having the advantages of a large line.

Princeton, Ill.—Of late years we have in our business found that we can do as well with the jobber, and at times better, than we can with the manufacturer, whose goods are represented and handled by jobbers. There are some lines in which we can get concessions from manufacturers by taking case lots and buying for long future, but we believe the delay in getting goods from manufacturers, the necessity of buying in larger quantities and extra freight more than equal the difference in price made us by manufacturer and jobber. Our rule is to favor the jobber when we can, though we have to buy some goods of manufacturers.

Washington, D. C.—We believe the general tendency is to buy direct from the manufacturer. This is particularly true of large and cash buyers, but, on the other hand, we believe the number of jobbers is increasing from year to year, because the smaller trade find it a great advantage to be able to buy an assortment of goods from one dealer, thereby saving them a great amount of freight. Furthermore, the small dealers do not always know where an article they want is made, and, by ordering it from their jobber, they generally succeed in obtaining what they want.

Fremont, Neb.—I carefully read the table prepared by Fred. P. Straub & Co. I have never taken pains to keep such a record, and am too busy now to look further into the matter than to say, with me, there has been increased direct dealings with the manufacturers from year to year. This, in my case, is caused principally by the desire to get the quantity discount in some cases, and the fact that the manufacturers are pushing out their salesmen, visiting trade they formerly did not call on or solicit.

Stanton, Mich.—In our opinion the general tendency is not toward increased trade direct with manufacturers, except in some special

lines of goods like Axes, Scythes or Nails. The average retail dealer securing a good assortment and prices ranging as low, if not lower, from jobber. The gain of securing goods in cleaner and more perfect shape is usually counterbalanced by carrying a larger

The store is on the street floor of a new two-story and basement brick building, specially erected for the Hardware business. The exterior is of red pressed brick and white sandstone trimmings, with gal-

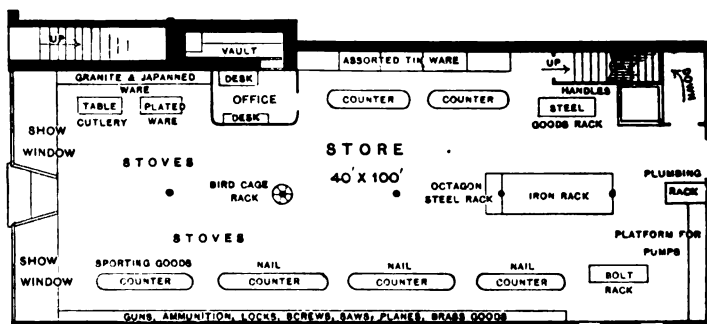


Fig. 294.—Congdon & Henry Hardware Co.'s Store, Rapid City, Dakota.

stock than necessary in buying direct and in original packages.

Doland, Dak.—We are buying two-thirds of our goods from jobbers.

Morrilton, Ark.—We buy more from manufacturers than formerly.

Canal Fulton, Ohio.—We should say the tendency was in favor of manufacturers. Such has been our experience within the last three years.

Cadiz, Ohio.—We buy more of late years of jobbers than we did 15 years since. We, of

vanized iron cornice. A general view of the store is given in Fig. 740, from which it will be seen that on either side of the wide entrance there are handsome show windows. The entrance is 10 feet in the clear, as shown in the plan, the dimensions of the store being 40 x 100 feet. It is entirely finished in Black Hills yellow pine, natural colors in oil and varnish, with trimmings of cherry, the projections being touched with jet black. The ceiling is

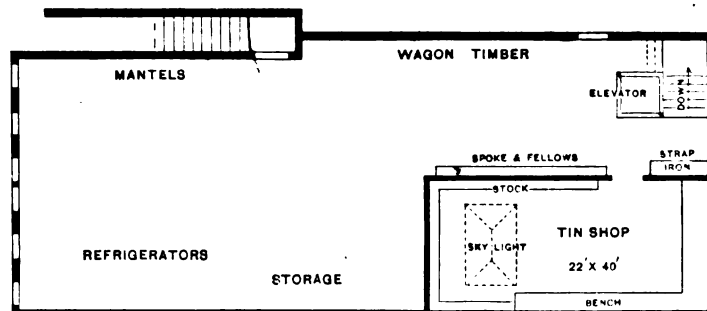


Fig. 295.—Second Floor.

course, buy heavy goods from the manufacturers, same as we have always done. We think our neighbors do about the same.

Wellington, Ohio.—I do not think in this section of the State that Hardware dealers, except very large dealers and jobbers, buy to any large extent direct from the manufacturers. As I buy my goods for cash, should avail myself of manufacturers' prices if it were to my advantage.

Arrangement of Stores.

The illustrations herewith given, Figs. 294 to 300, represent the complete and attractive store of Congdon & Henry Hard-

also of yellow pine, and is painted a light bluish tint.

The show windows are heavy plate glass and extend back into the store 6 feet. The floor of the show window is 13 feet front, and at the rear, or in line with the doors, it is 15 feet 3 inches, and is raised 18 inches above the floor of the store. This window space is not separated from the store in any manner whatever, and its depth allows a deep entrance, forming a vestibule, as shown on the plan with a cast-iron plate in front raised 3 inches above the sidewalk and extending

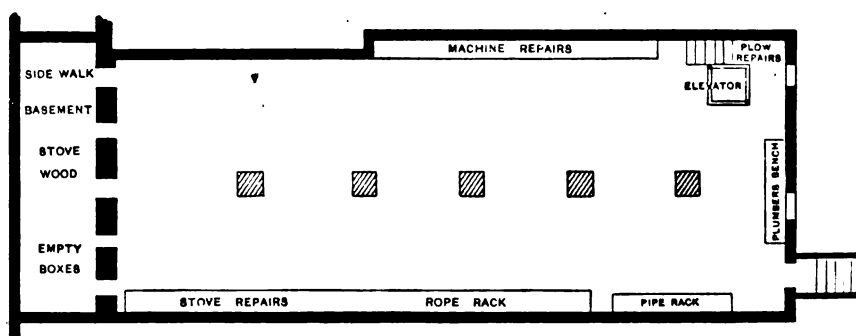


Fig. 296.—Basement.

ware Company, Rapid City, Dak. Besides indicating the general arrangement, it also explains some of the methods adopted for accommodating certain lines of goods, and suggestions will be found which will be of interest to the trade.

back 2 feet 6 inches. The other 3 feet 6 inches is an extension of the main floor, making an entrance in which it is very easy to handle all kinds of heavy goods, and is safe to walk on in all kinds of weather. It will also be observed that a

very large glass frontage is obtained by making the side lights in the entrance so deep (5 foot glass) and full height in one light, making a total frontage of six lights, or 575 square feet, while by allowing the glass to run so low, it is possible to see goods the full length of the store from the street.

The floor plan also indicates the general arrangement of the store, showing the location of shelving, counters, cases and racks, with a designation also of the goods to which they are devoted. On either side of the building next the show window is a large sample card against the wall, 14 feet 6 inches by 6 feet, which extends to the ceiling, which is 16 feet in the clear from the store floor.

The office is situated on the left side of the storeroom as you enter, 26 feet from the front. It is inclosed with railing of the same color and trimming as the shelving and fixtures, and has connected with

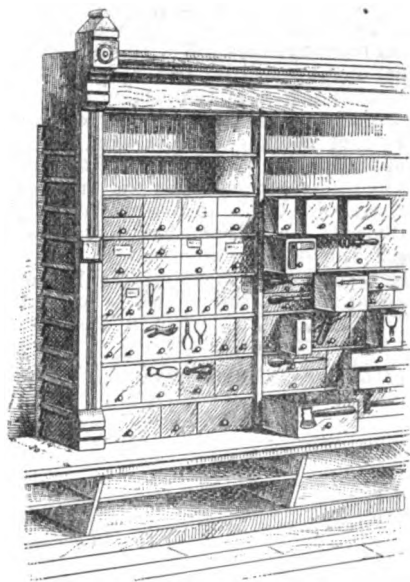


Fig. 297.—Section of Shelving.

it a fire-proof vault with double fire-proof doors built in the main wall of the building. This vault is 4 feet wide by 14 feet deep, with the safe located in the back end, leaving space for rack and pigeon-holes 9 feet long and 9 feet high, for circulars, quotations and papers of all descriptions, classified and arranged so as to be convenient at all times.

There is a satisfactory arrangement of shelving for Tinware, commencing at the vault and extending back. This shelving is flush with the vault, and at the ledge is 34 inches wide. The shelving is adjustable, and can be arranged to suit any size or style of Tinware, and is 27 inches wide. Under the ledge is a large space fitted for Hollow-Ware.

The counters on this side of the store are 3 feet 2 inches in the clear from the ledge or shelving, making room for two persons to pass each other easily. They are finished in the same style as shelving with cherry tops and round ends, and are built with panels in center, allowing the top to project, making it possible to stand up to the counter and yet not mar it at the base. There is an A-shaped iron rack in the center of the rear of the store with open space entirely around it for handling iron. The rack is so arranged that all iron shall be on end, as the ceiling is high enough to admit the longest Bars kept in stock. The rack is spaced off on all sides to separate different sizes and quantities, the front side being devoted to Pick and Tool Steel.

An inclosed stairway leads from the rear of the store around the elevator to

upper story, Fig. 295, where are tinshop and a large, well-lighted showroom with ceiling 14 feet in the clear. It will be noticed that the inclosed stairway leading from the rear of the store back of the elevator is lighted by a large window at the head of the stairway and runs to the base-

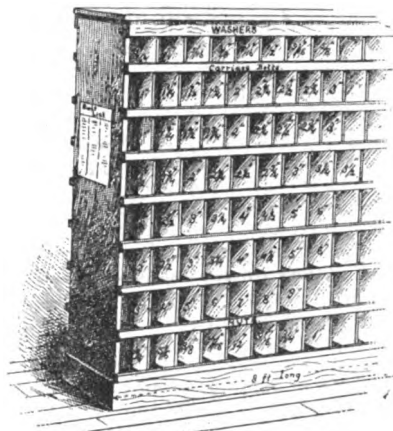


Fig. 298.—Rack for Bolts, Nuts and Washers.

ment, Fig. 296, which is full size of the building, 40 x 100 feet. This basement is floored with 2-inch plank and is 8 feet in the clear from floor to ceiling. It is lighted at front with four large windows and has a door for passage under the sidewalk, where there is additional storage room, 10 x 40 feet, lighted through the sidewalk. There are also three large windows in the rear.

Referring to some of the arrangements in use in this well-equipped establishment, Fig. 297 shows a section of the shelving on the right-hand side of the store with interchangeable sample boxes. The shelving is 14 inches deep, with a ledge 30 inches deep, or an extension of 16 inches from shelving. Under the ledge are two deep shelves for carrying goods too heavy for sample boxes, such as Grindstone Fixtures, Barn-Door Hangers, Strap and T Hinges, Bench Screws, &c.

Fig. 298 shows a portion of the Bolt rack, which, from the small amount of space it occupies, 8 feet by 22 inches, and the

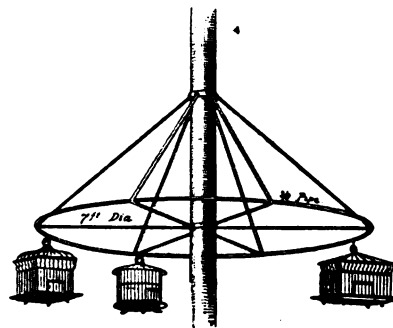


Fig. 299.—Bird-Cage Rack.

quantity of Bolts it is capable of holding, is referred to as exceedingly complete and satisfactory. As will be seen from the cut, the rack will carry a full line of Carriage Bolts, with the Washers necessary, on the one side; also a line of Threaded and Blank Nuts. On the opposite side is a small line of Norway, Machine, T-head and Tire Bolts and Lag Screws, all arranged according to size. As indicated in the engraving, the rack is built up square, 22 inches by 8 feet, with a flat top to carry extra stock, and has 168 pigeon-holes on each side. It is divided diagonally from end to end, admitting a Bolt 4 inches long in the shortest hole and 18

inches long in the longest hole. It will also be noticed that the rack is made to take in a full list of common Carriage Bolts made on the one line, so that it is only necessary to mark the thickness of wire on the frame at the end of the line and the length of the Bolt at the top of the pigeon-hole.

Fig. 299 is a Bird Cage Rack, attached to iron column in the center of the store, or it could, if desired, be hung from the ceiling. It is 7 feet in diameter, made of 4-inch round iron, braced with strap iron, and hangs from a fastening above on the post. It will hold three dozen common size Bird Cages.

Fig. 300 is a portion of Nail Counter. It is 2 feet 6 inches wide and 2 feet 9 inches high. These Counters are made in the same style as the other counters in the store, with round ends and cherry tops. They are, it will be seen, double-deck counters, the Nail bins being 18 inches

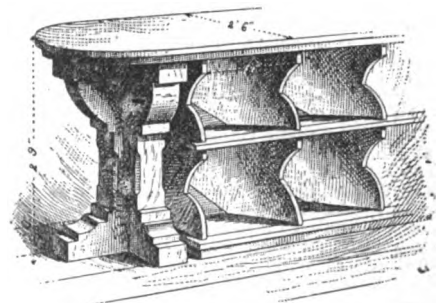


Fig. 300.—Nail Counter.

wide in the clear and will hold about 200 pounds each. They are so built that the Nails can be drawn from either side of the Counter.

Exports.

PER SHIP SOUTHERN CROSS, OCTOBER 26, 1888,
FOR SYDNEY, N. S. W.

By H. W. Peabody & Co.—600 pieces Staves.
By F. B. Wheeler & Co.—300 dozen Brooms,
7½ dozen Brushes.
By T. Basanta.—550 dozen Handles, 44 dozen Saws, 20 dozen Handles, 34 dozen Saws and Files, 20 dozen Shovels, 40 dozen Clocks, 1 dozen Toy Blocks, 1 gross Toy Guns, 50 gross Paper Caps, ½ dozen Air Guns, 1 dozen Lanterns, 1 dozen Refrigerators, 2 1-6 dozen Bird Cages, ½ dozen Air Guns, 27 dozen Lamp Goods, 8½ dozen Lamp Goods, 2 dozen Lamp Goods, 30 dozen Ice Chests, 1500 Wheels and Axles, 12 Clocks, 40 Step-Ladders.
By Leaycraft & Co.—25,393 pieces Roofing Slate.
By Hsley, Doubleday & Co.—4 Carts, 15 gross Axle Grease, 13 dozen Castings, 3 barrels Castings, 2½ gross Axle Grease, 181 pounds Glue, 5 gross Toys, 6720 pounds Axle Grease.
By Coombs, Crosby & Eddy.—1200 pounds Nails, 6 dozen Hatchets, 30 dozen Axes, 1 dozen Mangles, 42 Wringers, 1 dozen Churns, 3 dozen Pumps, 16 dozen Rakes, 70 dozen House-Furnishing Goods, 4 dozen Tools, 13 gross Hardware, 3 gross House-Furnishing Goods, 7 dozen Tools, 4 gross House-Furnishing Goods.
By R. W. Cameron & Co.—40,000 pieces Slate, 49 packages Machinery, 6 boxes Pumps, 5418 pounds Tires, 10,270 pounds Bolts.
By Healy & Earl.—12 boxes Saw Mills, 9 cases Pumps, 1 Planing Machine, 2 Saw Frames, 16 cases Wood-Working Machinery.
By Peters & Calhoun Company.—2 cases Saddlery.
By W. & B. Douglas.—50 Pumps.
By H. F. Roberts.—2 cases Plated-Ware, 9 packages Plated-Ware, 1 case Clocks.
By H. A. Rogers.—1 Iron Safe.
By Singer Mfg. Company.—797 cases Sewing Machines.
By Ansonia Clock Company.—9 boxes Clocks.
By W. K. Freeman.—19 packages Agricultural Implements.
By E. F. C. Young.—2 cases Lead Pencils.
By A. S. Lascelles & Co.—32 dozen Hatchets, 5 gross Hardware, 35 dozen Axes, 8 dozen Mattocks, 6 dozen Picks, 86 dozen Pails, 3 barrels Cow Bells, 32 dozen Hatchets, 35 dozen Axes, 8 dozen Mattocks, 6 dozen Picks.
By E. Miller & Co.—26 packages Lamp Goods.
By Plumb, Burdick & Barnard.—6 cases Iron Bolts.

By *National Mfg. Company*.—4 cases Rat Traps.
 By *Manhattan Brass Company*.—3 cases Lamp Wicks.
 By *Bradley & Hubbard*.—3 packages Lamp Goods.
 By *Crane & McMahon*.—26 bundles Rims.
 By *McCoy & Sanders*.—1 case Hardware.
 By *J. L. Mott Iron Works*.—91 packages Stoves.
 By *R. W. Forbes & Son*.—12 packages Fire Arms, 10 cases Clocks, 93 cases Sewing Machines, 1 box Hardware, 44 packages Wagons, 2 cases Hardware, 6 cases Stoves, 900 feet Hose, 7 packages Agricultural Implements, 12 crates Stoves, 5 packages Fire Arms.
 By *Strong & Trowbridge*.—2 cases Hammers, 1 case Traps, 8 cases Hardware, 3 cases Nails, 1 barrel Tools, 3 packages Hardware, 2 cases Hardware.
 By *McLean Bros. & Rigg*.—66 dozen Handles, 2 dozen Graters, 15 dozen Forks, 3 gross Vegetable Presses, 4 gross Mouse Traps, 216 dozen Lamp Chimneys, 1 gross Graters, 1 case Machine Extras, 14 cases Agateware, 5 dozen Wrenches, 1 dozen Alarm Tills, 432 Lamps, 100 dozen Illuminators, 7 cases Agateware, 30 dozen Picks, 50 dozen Wicks, 20 dozen Cow Bells, 13 dozen Chisels, 100 dozen Hammers, 3 dozen Wringers.
 By *Arkell & Douglas*.—16 dozen Shovels, 21 dozen Axes, 19 dozen Hoes, 12 gross Chimneys, 3 gross Blacking, $\frac{1}{2}$ dozen Corn Mills, 1 dozen Guns, 50,000 Primers, 5000 Cartridges, 5000 Shells, 1-6 dozen Trucks, 10 dozen Axes, 2000 Broom Handles, 22 dozen Picks, 504 dozen Handles, 40 dozen Axes, 9 dozen Traps, 24 dozen Reflectors, 1130 pounds Castings, 4 dozen Wheels, 200 pounds Castings, 1 gross Broom Handles, 200 dozen Handles, 20 dozen Shovels, 2500 Broom Handles, 3 dozen Corn Mills, 20 dozen Picks, 80 dozen Axes, 10 dozen Picks, 40 dozen Shovels, 60 dozen Axes, 20,000 Cartridges, 1 dozen Guns, 70,000 Primers, $\frac{1}{2}$ dozen Machines, 66 cases Ranges.
 By *Arnold, Cheney & Co.*.—4 cases Wagons, 17 cases Wagons, 11 cases Bolts and Nuts, 14 Wheels, 100 cases Axes, 5 cases Brooms.
 By *W. H. Crossman & Bro.*.—21 dozen Washboards, 96 dozen Chimneys, 30 dozen Axes, 240 dozen Handles, 2 dozen Corn Mills, 1 dozen Stove Trucks, 2 dozen Guns, 3 dozen Reloading Tools, 132 dozen Mouse Traps, 1 Wagon Jack, $\frac{1}{2}$ dozen Lathes, 2 cases Hardware, 9 cases Hardware, 11 cases Tools, 170 dozen Handles, 24 dozen Shade Rollers, 12 dozen Mouse Traps, 8 cases Tools, 3 cases Hardware, $\frac{1}{2}$ dozen Hand Carts, 2 dozen Grindstone Fittings, 8 dozen Hatchets, 40 dozen Handles, 1 case Guns, 100 boxes Clothes Pins, 32 boxes Stove Parts, 1 Cask Pumps, 3 packages Lamp Goods, 8 Scroll Saws, 6 cases Tools, 6 cases Hardware, 17,000 Cartridges, 100,000 Primers, 20 Guns, 6 dozen Grindstone Fixtures, 17 dozen Wrenches, 20 dozen Hatchets, 35 dozen Handles, 6 dozen Horse Brushes, 6 cases Tools, 2 cases Hardware, 16 dozen Axes, 1 case Tools, 1 case Hardware, 19 packages Lamp Goods, 14 packages Pumps, 3 dozen Bird Cages, 3 cases Tools, 19 cases Hardware, 40,000 Cartridges, 60,000 Primers, 67 Guns, 12 dozen Mop Handles, 1 dozen Vises, 7 $\frac{1}{2}$ dozen Saws, 12 dozen Picks, 20 dozen Axes, 1 dozen Lawn Mowers, 32 dozen Wrenches.

PER SHIP MINISTER OF MARINE, OCTOBER 25,
FOR MELBOURNE, AUSTRALIA.

By *R. W. Cameron & Co.*.—5 cases Nuts and Bolts, 4 cases Whip Handles, 10 cases Axes, 6 cases Sandpaper, 1 case Hardware, 16 cases Axle Grease, 1 case Brushes, 2 cases Whips.
 By *Coombs, Crosby & Eddy*.—24 dozen Handles, 4 dozen Rakes, 1 dozen Plated-Ware, 42 Blocks, 3 dozen Handles, 5 dozen Carpenters' Tools, 6 Cash Boxes, 24 dozen Shovels, 6 Lawn Mowers, 12 dozen Combs, 157 dozen Hardware, 37 dozen Carpenters' Tools, 7 dozen Axes, 3 dozen Iron Hooks, 21 dozen Garden Tools, 6 dozen Axes, 120 cases Skates, 500 gross Crayons, 2 Printing Presses, 30 gross Lead Pencils, 6 gross Glue.
 By *Strong & Trowbridge*.—20 cases Axes, 3 cases Hammers, &c., 6 cases Handles, 2 cases Pumps, 1 case Shade Rollers, 2 cases Lampware, &c., 6 cases Hardware, 30 cases Axes, 3 cases Saws, &c., 28 kegs Nails, 2 cases Lampware, &c., 3 cases Hardware, 14 cases Cartridges, 1 case Nails, 1 case Hardware, 1 case Choppers, 1 case Hay Forks, 1 case Hammers, 35 cases Axes, 4 cases Hatchets, 1 case Hardware, 20 cases Axes, 2 cases Hatchets, 4 cases Hardware, 1 case Rivets, 1 case Traps, 6 cases Nails, 45 Kegs Nails, 1 case Nails, 100 Boxes Clothes Pins, 8 packages Hardware, 3 cases Tools, 3 cases Wringers, 1 barrel Blocks, 3 cases Hardware, 12 cases Emery Wheels, 2 cases Locks, &c., 1 case Twine, 1 case Rakes, 1 case Hardware, 2 cases Hardware.
 By *A. S. Lascelles & Co.*.—39 cases Handles.
 By *Meriden Britannia Company*.—2 boxes Plated-Ware, 5 packages Plated-Ware.

Business Methods.

We have from time to time published information in regard to matters relating to the details of business, with suggestions as to new and improved methods. Among enterprising and progressive business men there is a constant change, as old methods are superseded by others which secure a saving of time with better system and greater accuracy and convenience in despatch of business. While the plans that are found adapted to the exigencies of certain houses may not be suited to the business of others, information in regard to them is notwithstanding stimulating and serviceable and often leads to the devising of new and better methods. We shall therefore value suggestions from our readers in regard to desirable methods relating to any of the many details connected with the carrying on of business. While information in regard to bookkeeping in any of its departments will be of general interest, specific advices in regard to methods of buying, keeping accounts, recording prices, classification of Hardware in price books, or otherwise, suggestions in regard to taking stock and many other similar topics will be of especial service to our readers.

From Elsworth & Dudley, Poughkeepsie, N. Y., we have received a card, reproduced below, which they use in sending remittances. They refer to having found it very satisfactory after a use of several years. The card is as follows, printed in red ink:

Check on Fallkill National Bank, Poughkeepsie, N. Y.

No. Dated 188

To

For account

Amount \$

Please return this card, after receipting on the back.



*Elsworth & Dudley,
260 Main Street, Poughkeepsie, N. Y.*

The back of the card contains simply a line for the date, the words "Received the check sent herewith" and a line for the signature. The fact that the card, which, it will be observed, is returned receipted, as per the form printed on the back, gives, it will be seen, a complete memorandum of the payment.

Effects of Rolling and Wire-Drawing Upon Mild Steel.

An interesting paper has been contributed to the Institution of Civil Engineers by Mr. Horace Allen, which is summarized by the *Ironmonger*. That gentleman made a series of tests in order to prove that the manipulation of steel, during its formation into wire, had greatly increased its tensile strength. He selected a mild-steel billet, 2 inches square in section, and having the following chemical composition: Carbon, 0.115; silicon, 0.009; sulphur, 0.068; phosphorus, 0.072; manganese, 0.410, and iron, 99.326. A portion of this billet was turned down for testing, and sustained a breaking-load of 28.08 tons per square inch, with an elongation of 28.1 per cent. Another portion of the billet was rolled into wire rod. In this case the rods were

found to have increased in elastic limit by from 17 tons in the billet to 25 tons in a No. 5 wire rod, or an increase of 47 per cent. The breaking-stress was raised in all cases, a No. 1 rod increasing from 28 to 32 tons. The reduction of area at the point of fracture was increased in all the specimens, being from 54 per cent. in the billet to 67 per cent. in No. 5 rod. The specific gravity was increased by rolling from 7.826 in the original billet to 7.865 in the rolled wire rod and 7.852 in the annealed wire rod.

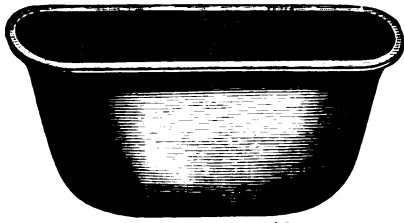
The author of the paper says it is evident that the density of the steel is considerably and permanently affected by the effect of rolling the iron. Although the billets were strongly heated before the commencement of rolling, the temperature fell rapidly during the operation, on account of the sectional area becoming very much reduced; and the temperature of the finished rod, on leaving the rolls at a red heat, continued to fall rapidly, consequent on the relatively large surface of the rod, the molecules of which had not time to rearrange themselves in the same manner as they probably had done in the billet, in which case the section of the rolled steel was comparatively large, and the rate of cooling much slower. The alteration in the physical properties of the wire rod, compared with the original billet, as shown by the increased elasticity and tenacity and diminished elongation of the rod, is doubtless due in some measure to the effect of rapid cooling in the process of manufacture. This is proved

by the fact that after annealing the wire rod, by placing it between pieces of white-hot steel and allowing them to cool slowly together, the results of tensile tests showed that the steel was brought a little nearer to the condition of the original billet. Rolling the steel down to such small sizes at a high temperature induces absolute molecular contact, closing up any microscopic cavities left in the steel when in the form of a billet. This probably accounts, to some extent, for the increase of the elastic limit and breaking-stress; because the continuity of the molecules is less broken than in steel which has had less work upon it. Mr. Allen deems remarkable the increased contraction of area in the wire rod. Generally, the effect of putting mechanical work upon steel is the production of increased tenacity, accompanied by a diminished contraction of area, yet in wire rod the tenacity and the contraction of area are greater.

Puget Sound, in Washington Territory, exported during the first six months of 1888 lumber to the value of \$705,500, nearly all of it to Australia, and considerably in excess of the trade last year.

Sperry's Hog Scalders.

D. R. Sperry & Co., of Batavia, Ill., have just brought out a new article of seasonable interest. It is a heavy cast-iron



Sperry's Hog Scalders.

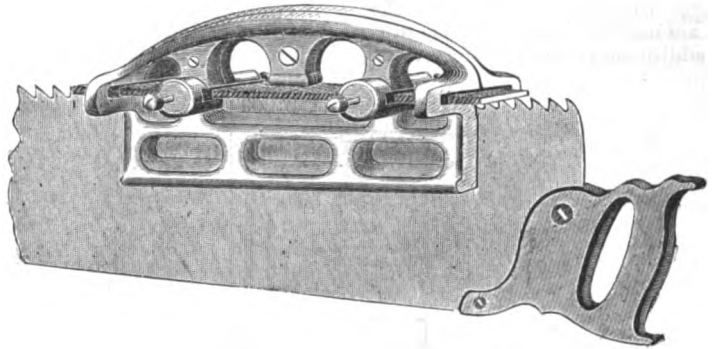
kettle intended for use in scalding hogs. Its shape and general appearance are shown in the accompanying cut. Its inside dimensions are as follows: 5 feet 4 inches long, 2 feet 6 inches wide and 2 feet deep. The manufacturers state that the shape and dimensions were furnished them by a practical butcher and are just what is required, being amply large enough to take in the largest hog. It is in-

point is made that in this way all the teeth are given exactly the same set. Special attention is also called to the fact that as this saw-set is made the hood, bed plate or anvil, and die-bar are so arranged as to give the operator full view of the saw teeth while setting. The pressure is

with which it can be used, as well as its simplicity and effectiveness, are alluded to.

Marlin Repeating Rifle, Model 1888.

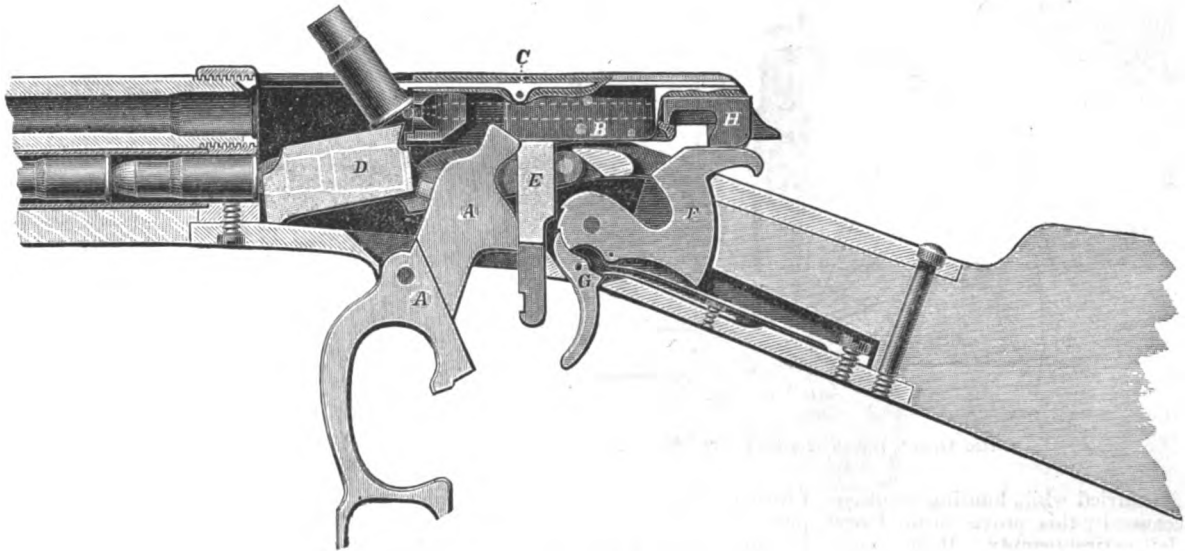
This arm, which has recently been put on the market, is manufactured by the



The Practical Saw Jointer.

referred to as easy and directly downward on the teeth, without liability of bending or twisting the saw or saw blade, or break-

Marlin Fire Arms Company, New Haven, Conn. The accompanying illustration represents the weapon open, and indicates



Marlin Repeating Rifle, Model 1888.

tended to be set in a low brick arch, so arranged that the hog may be immersed directly in the kettle.

The Superior Saw-Set.

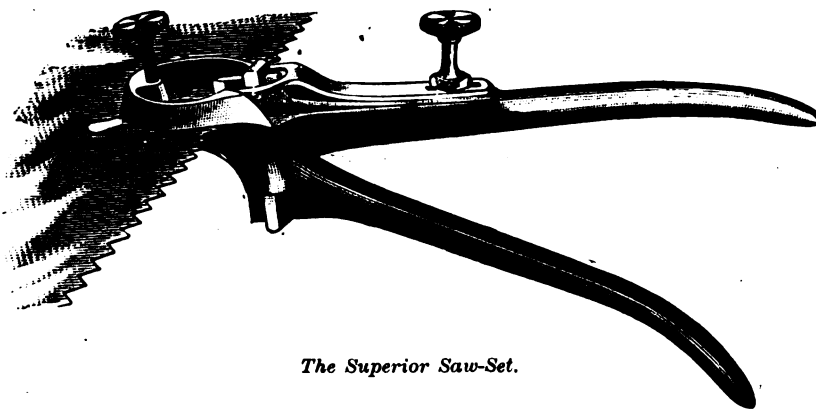
The American Tool Company, Canton, Ohio, are manufacturing the saw-set shown in the accompanying illustration. It is de-

ing the teeth. The manufacturers also call attention to the excellence of material and workmanship.

The Practical Saw Jointer.

The above article is put on the market by Danforth & Pike, 114 Washington street, Boston, Mass. It is used on the saw as shown in the cut. The file in the

in a general way the method of its operation. Its different parts are designated as follows: A, the lever; B, the breech bolt; C, the extractor; D, the carrier block; E, the locking bolt; F, the hammer; G, the trigger. The lock mechanism is referred to as simple, having but few pieces, and these so constructed as not to be liable to get out of order. The breech bolt, which is of steel, comes up solidly against the end of the barrel, and is locked in its place by a square locking bolt of tempered steel, which slides up and down in grooves in the frame on the same plan as the breech block in the well-known Sharp's rifle, and has also as a backing the solid part of the frame. This arrangement is to do away with all weak devices which are liable to break or get out of order. This locking bolt is operated directly by the lever without the aid of any links or other pieces. The firing pin is drawn back by the locking bolt, and is held by it until the cartridge is placed in the chamber of the barrel and the bolt firmly locked in its place, by this means making the premature explosion of a cartridge impossible. The gun is so constructed that in operating it the cartridges do not jump back into the carrier block, as in many rifles of this kind, but slide back with the opening of the bolt, thus avoiding the danger of having a cartridge explode in the magazine tube by the sudden jumping of the whole column of cartridges in the tube. The manipulation is referred to as exceedingly easy and almost noiseless. It is



The Superior Saw-Set.

signated as the Superior. In the use of this saw-set the gauge is set over the die-bar to the length of the saw-teeth, and the set for the teeth is regulated by lowering or raising the gauge screw, locking it with the small lock nut, which can be used above or below the hood. The

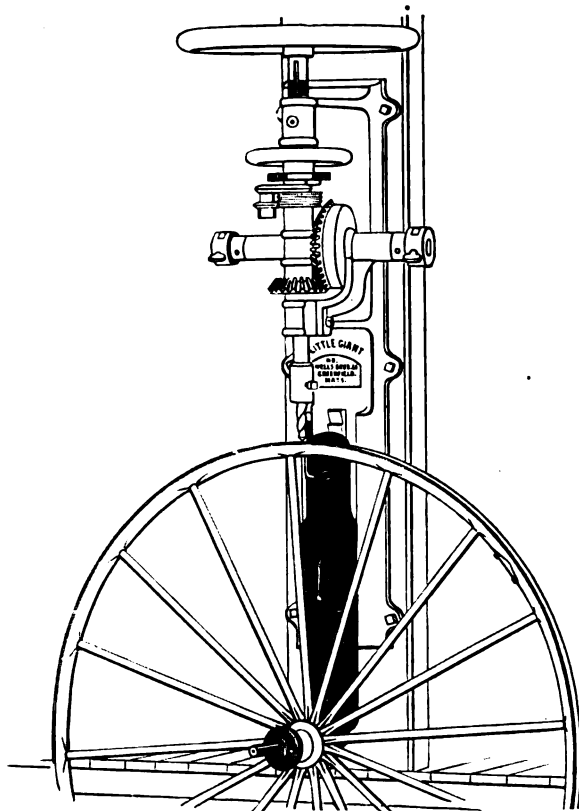
slot is adjustable so that the full width of the file may be utilized on one side, then the file reversed and used in the same way until it is all worn out. This tool is referred to as making a great saving in time, and insuring accuracy in jointing the teeth to an equal length. The ease and facility

sometimes desirable to cut off the supply of cartridges from the magazine, and this can be accomplished by pressing in very slightly the spring cover over the loading hole in the side of the frame. Doing this holds back the cartridges, so that none can enter the carrier, but the rifle may still be operated as usual, and thus used as a single-loader while the cartridges in the magazine are held in reserve. It also provides an additional means of safety when

is permitted to escape into the glass. The point is made that in this way the pulp and seeds are left in the strainer, permitting only the clear juice to escape.

Little Giant Wheel-Holding Attachment.

The illustration represents this article, which is simply an extra tail-block to their



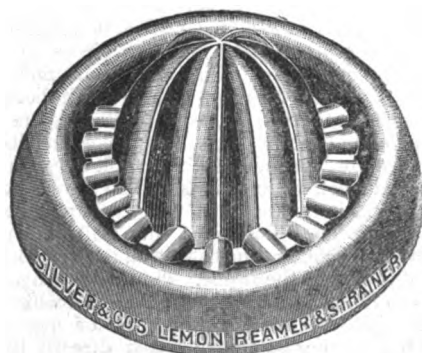
Little Giant Wheel-Holding Attachment.

the rifle is carried while hunting or otherwise, because by this provision the barrel may be left entirely empty. If the magazine be not cut off after firing one or more shots, there will always be either the last exploded shell or a loaded cartridge in the barrel. This rifle is designed to use 32, 38 and 44 caliber cartridges of the Win-

Little Giant drilling machines, which is put on the market by Wells Bros. & Co., Greenfield, Mass. It is used for drilling the tire while on the wheel. This tail-block slides up and down in the ways of the machine, so as to overcome the difference in the size of wheels. Two tail-blocks are thus furnished with the machine, one to drill flat work upon the table of the machine and the other to drill tires, as shown in the cut.

The Novelty See-Saw and Merry-Go-Round.

The Canton Saw Works, Canton, Ohio, are putting this article on the market. It



Lemon Reamer and Strainer.

chester 1873 model. The rifle is now offered in 24, 26 and 28 inch octagon barrel, 38 and 44 caliber. The 32 caliber and round barrels of the various sizes will be put on the market at an early date.

Lemon Reamer and Strainer.

Silver & Co., 56 Warren Street, New York, are putting on the market this article, a cut of which is given herewith. It is made of glass, fits on top of a tumbler or goblet and has openings by which the juice which is extracted by the reamer

is illustrated in the cut given below, which indicates in a general way its construction and use. It is made in two sizes: The standard size for lawn and playroom is 8 feet long, and has seats to comfortably accommodate grown persons; the size for parlor or nursery use is 6 feet long, with seats adapted for children only. The board

on which the seats are placed rests upon a standard or support of the form shown, which is so arranged that it can be raised to different heights to suit the comfort of the persons riding, and also folds up compactly so as to permit of its being put away in a small space. The socket on the under side of the board, into which the



Fig. 1.—The Eclipse Ice Creeper.

round top of the support fits, can readily be moved so as to balance persons of different weights, and the construction is such as to permit a motion up and down as a see-saw, or around in a circle, or both combined. The manner in which seats are attached permits their being placed in any desired position, either straight or sideways at an angle. The attractiveness of this article and the pleasure with which it is used by children, together with its simplicity of construction and durability, and the fact that there is no place about the bearings that the children can be pinched while the machine is in use, and

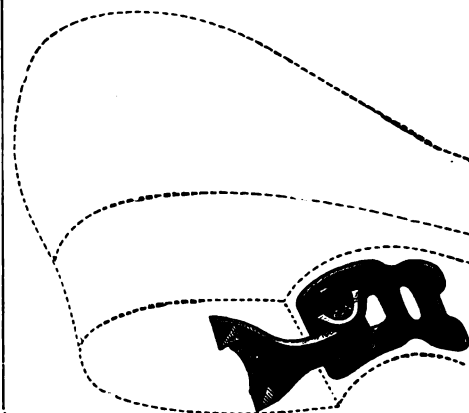


Fig. 2.—Ice Creeper Attached to Rubber.

the moderate price at which it is offered, are points made by the manufacturers in regard to it.

The Eclipse Ice Creeper.

This article is made by L. A. Sayre, Newark, N. J., and is designed especially for ladies' use on rubbers. It is fastened



Novelty See-Saw and Merry-Go-Round.

securely through the shank of the arctic or rubber shoe by clamping the points on the inside. It is claimed that if properly clinched no water can penetrate where the points pass through the rubber. It is also stated that it can be fastened on by any one, no separate rivets or washers or special machine being required.

THE IRON AGE

THURSDAY, NOVEMBER 22, 1888.

Improved Pipe Cutting and Threading Machinery.

Every one who has ever done any cutting or threading of large sizes of pipe with the old style of die stock, with its long handles, knows of the difficulties with which the work is attended. The improvements which have more recently been effected in machinery of this class by Messrs. Curtis & Curtis, of Bridgeport,

should not be exactly standard. To operate the machine, the pipe is placed in the vise at the back, with the end to be cut against the back of the dies, and is clamped by turning a hand-wheel at the top, which brings it central. Then, having loosened the thumb-screws on the face plate, it is turned to the mark corresponding to the size of the pipe, which brings the dies to standard size. A very slight pressure on the lever on the top forces the gear back into the shell and the dies on the pipe,

gear revolves it runs back into the ring and the dies are brought on to the pipe. Both jaws work on one screw, the top half of the screw being right-hand and the lower half left-hand. By turning the hand-wheel on top of the machine it not only clamps the pipe but brings it central with the dies as well. The Nos. 2 and 3 machines are also made much heavier in some places than in the old style and the pitch of the gear is heavier. The machines thread and cut off all sizes

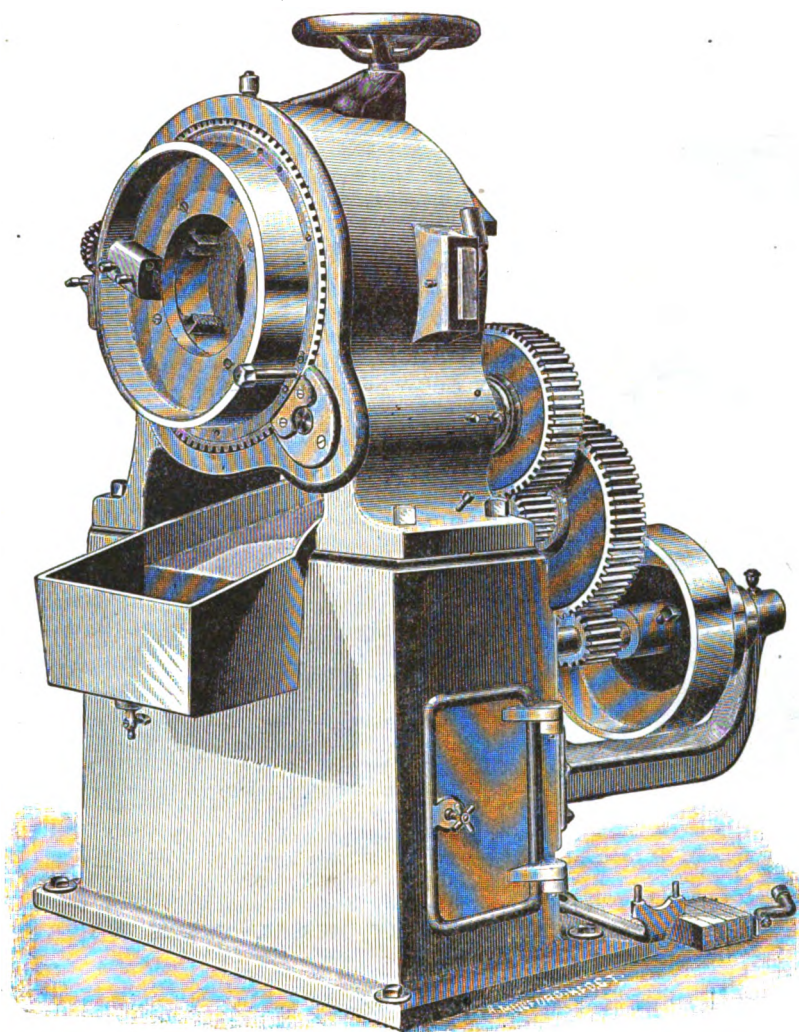


Fig. 1.—Power Pipe Cutter and Threader.

PIPE CUTTING AND THREADING MACHINERY, BUILT BY MESSRS. CURTIS & CURTIS, BRIDGEPORT, CONN.

Conn., are, therefore, of some interest. In their Forbes die stock, the customary long handles have been replaced by gearing, by which compactness and power are gained. The No. 1 stock has a range from $\frac{1}{4}$ to 2 inch, inclusive, both right and left hand threads, and weighs only 60 pounds complete, thus making it very handy to carry around from place to place. The gear that carries the dies fits into the main casting or shell and is supported on the outside of the teeth, while the pinion is imbedded in the side, and the pipe to be cut is held stationary in a self-centering vise at the back. The bits or dies are adjustable and are drawn forward or backward by cams behind them, thus bringing them to standard size, or allow the pipe to be cut over or under size in case the fittings

while the gear is revolved by the crank on the pinion. A change from right to left hand threads, or left to right, is made by simply changing the dies and reversing the motion of the crank. This size of machine is made without a cut-off, as it is found that a three-wheel roller cut-off will do more work than it is possible for any hand machine to do on small pipe. Six-inch nipples can be made on this machine, and by using the ordinary nipple holders a short or close nipple can be cut.

The No. 2 machine works on the same principle as the No. 1, except that a lead screw is used for forcing the dies on to the pipe instead of a lever. It is placed on the back of the gear and screws into a brass ring which has the same number of threads to the inch as the pipe. As the

from 2 to 6 inches, inclusive. They are arranged for power by the addition of a cast-iron base and a worm and gear attached at the back of the pinion.

The power machine which we show on this page is like the Nos. 2 and 3 hand machines, excepting that it is much larger and heavier, and, unlike them, and like the No. 1, only two sets of bits are used for all sizes. Speed and power are thus coupled with cheapness and durability. The No. 3 $\frac{1}{2}$ power pipe machine cuts off and threads all sizes from 2 $\frac{1}{4}$ to 6 inch, inclusive; the No. 4, from 4 to 8 inch, and the No. 5, from 8 to 12 inch.

The H. C. Frick Coke Company, of Pittsburgh, have purchased the Clinton Coke Works on the Mount Pleasant branch

of the Baltimore and Ohio Railroad, one mile above Scottdale, from B. F. Keister & Co. The plant consists of 110 acres of surface, about 80 acres of coal, and 44 ovens, including the old workings of ribs which may possibly be recovered. It is stated that the price paid for the property was \$90,000. Work has already been commenced, firing the ovens and mining coal.

Manufacture of Wood Screws.

A recent visit to an extensive works, manufacturing wood screws, afforded us an interesting opportunity of witnessing the successive stages of development of a finished wood screw from the rough, raw material in the shape of steel wire rods. Though in a general way the method of manufacture is familiar to many, a brief review of the various processes may not be without interest. The wire rods, which

next blank. The finished blanks, having gone through a rattler, are then taken to the threading machine. In this also the entire operation is automatic. The blanks pass along a slide, one by one, in the same way, are properly gripped and presented horizontally to a cutting tool secured in a movable tool block. This has the necessary amount of longitudinal feed to give the desired pitch to the thread, and has a quick return motion, several cuts being taken before a finished thread is secured. Soda water is used as a lubricant. The finished screws are here also dropped into a receptacle underneath the machine and are then ready for packing and shipment.

From the nature of the operations it is apparent that a large number of machines can be handled by one attendant. All that is necessary is to see that the feed hoppers are kept supplied. The capacity of the machines, of course, depends upon the size of the screw to be made—that is,

Improved Corrugated Steel Tires.

A year or two ago we referred to the corrugated rolled steel tires, invented by Mr. William Fox, of Leeds. At that time these corrugations ran in parallel lines—that is to say, the depressions and projections of the wavy line occurred alternately on opposite sides of the tire. Experience has, however, shown that by making the projections to correspond on opposite sides the tire was materially improved, and by this slight alteration in the design Mr. Fox gets over an æsthetic difficulty, for, while the old type of tire was acknowledged to be of immense service on the tram lines, it had the general appearance of being caked or thickly encrusted with road dirt, and this, taken in conjunction with its unsightly, serpentine configuration when in motion, has been probably the main drawback to its general adoption. By the adoption of this tire, which is suit-

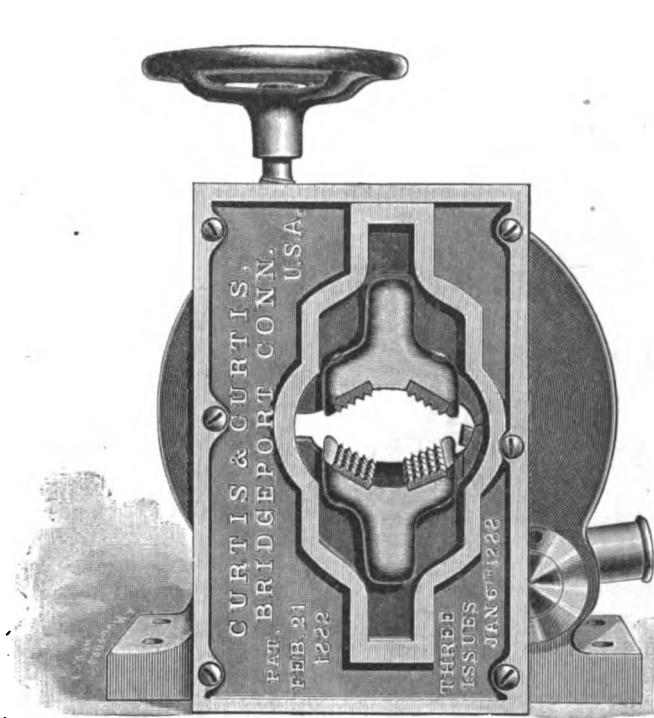


Fig. 2.—Back View of No. 2 Die Stock.

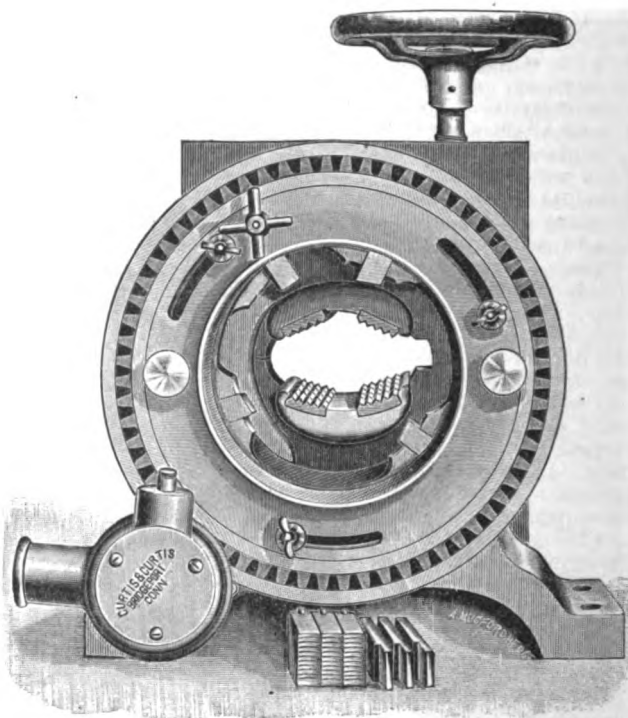


Fig. 3.—Front View.

PIPE CUTTING AND THREADING MACHINERY, BUILT BY MESSRS. CURTIS & CURTIS, BRIDGEPORT, CONN.

to a great extent are imported, are first cleaned and drawn into wire of desired gauge for the different sizes, or rather diameters, of screws to be turned out. This wire on reels is next fed into what are known as heading machines, in which the screw blanks are partially formed, the proper length of wire for a screw being cut off and a head being formed by one or more blows from a header. These rude blanks are then dumped into a form of hopper attached to a machine for cutting the slots in the heads and shaving off the latter so as to present a finished appearance. The necessity of this latter operation becomes apparent when it is considered that the beveled heads as formed in the heading machine are not sufficiently smooth to meet the requirements of practical work, the metal flowing more or less irregularly. The rough blanks are fed along a slide automatically, each one in turn being held firmly by suitable gripping dies, presented to the milling cutter for cutting the slot in the head, and the tool for turning the circumference of the head and the beveled surface on the under side, and is then released, falling into a receptacle underneath to make room for the

the length and diameter—the amount of metal to be removed varying in each case. The work throughout is of an exceedingly interesting character, and furnishes a striking illustration of the perfection to which automatic mechanism has been carried.

Mr. Michael Longridge suggests the use of the following formula for the safe-working pressure for cylindrical furnaces and flues, as applicable to all cases likely to occur in practice:

$$\text{Safe working pressure} = \frac{50t^2}{\sqrt{LD}} - \frac{D}{L}$$

t , the thickness of the plates being taken in thirty-seconds inch; if t be taken in sixteenths, the No. 200 should be used instead of 50.

D = diameter in inches.

L = length in feet.

The Hughes Steam Pump Company, of Cleveland, Ohio, have been awarded the contract for all the pumps—five in number—for the new *Pioneer Press* building in St. Paul. One of the pumps is to be of the compound, duplex type, the balance being high-pressure duplex pumps.

able for the wheels of all classes of vehicles, the constant violent and injurious skidding of the wheels of vehicles when endeavoring to cross, and coming in contact with the edges and grooves of street car tracks is entirely avoided, to show how inventions such as these are worthy the appreciation of the public. The frequent lateral projections on the edges of the tire instantly cause the vehicle to mount the rails. Safety and economy are thus effected—safety because the risk of the occupants of the vehicles being thrown out or shaken is avoided; economy because there is no shock to the wheels, the life of the nave, the spokes, and the felloes is prolonged, the paint is preserved, the springs, pins, and other parts of the vehicle are not twisted or contorted, and consequently last a much longer time without needing repairs.

The Hill Clutch Works, of Cleveland, Ohio, have just made a contract with the Jenney Electric Light Company, of Fort Wayne, Ind., to furnish them a complete plant of power transmission machinery for a station they are putting in that city, to be put in according to their designs.

Natural Gas in Iron Making *

The prominence which natural gas has recently attained as a fuel in the manufacture of iron and steel in the United States naturally directs attention to its relation to other kinds of fuel which are used in this great American industry. It may be premised that no other country, not even Great Britain, is so richly endowed as this country with fuel adapted to the various processes used in the manufacture of iron and steel, in both their crude and finished forms. We have in some sections extensive forests for the supply of charcoal; in others there is an abundance of bituminous coal, much of which makes excellent coke; in Eastern Pennsylvania are extensive fields of anthracite coal; and in Western Pennsylvania and neighboring territory is the natural-gas region. As iron ore is also widely distributed in the United States, no natural obstacles exist to prevent this country from becoming in all respects the most conspicuous leader in the world's iron and steel industries, and this position it is rapidly attaining, as the figures already given abundantly show; in many respects it has already attained this distinction.

Originally all our iron and steel was made with charcoal, which remained our principal fuel for making iron and steel for many years. In the last century bituminous coal was sparingly used in heating furnaces; in the early part of this century it began to be used in puddling furnaces; in 1839 we commenced to make pig iron with bituminous coal in the form of coke, and in 1845 we successfully introduced the use of raw coal in the blast furnace. To-day most of our pig iron is made with coke, either alone or as a mixture with anthracite or raw bituminous coal. In the early part of this century we began to use anthracite coal in the heating furnace, and subsequently in the puddling furnace.

A few years before 1840 we successfully experimented with the use of anthracite coal in the blast furnace, and in that year its use in the manufacture of pig iron was fully established. Anthracite coal is no longer used in puddling furnaces, except in very rare instances, and its use in heating furnaces is rapidly yielding to the encroachments of bituminous coal. Except where natural gas is used, bituminous coal is generally used in our puddling and heating furnaces. Charcoal is still used in the manufacture of "charcoal" blooms, whether made from ore or pig iron and scrap, and it is used in the manufacture of our very small annual product of cemented steel, but it is not used in the manufacture of any other finished forms of iron or steel. In the production of gas for use in Siemens and other regenerative heating furnaces our dependence was chiefly upon bituminous coal and very slightly upon anthracite coal until the advent of natural gas.

In 1854 the United States made more pig iron with charcoal than with anthracite coal. The next year charcoal was passed by anthracite coal, and in 1869 it was passed by bituminous coal. Anthracite continued, however, to be the leading fuel until 1875, when it too was passed by bituminous coal, which has since continued to be the favorite blast-furnace fuel. In the following table the production of pig iron in 1883, 1886 and 1887, classified according to the fuel used, is given in tons of 2000 pounds:

Fuel used. Net tons.	1883.	1886.	1887.
Bituminous.....	2,690,660	3,806,174	4,270,635
Anthracite and coke	920,142	1,655,851	1,919,640
Anthracite alone....	965,254	443,746	418,749
Charcoal.....	571,726	456,567	578,182
Total.....	5,146,972	6,365,328	7,187,206

* From a paper by James M. Swank, printed in the "Mineral Resources of the United States," published by David T. Day, Chief of Bureau of Statistics and Technology, United States Geological Survey.

The development of natural gas in this country as a fuel in the manufacture of the finished forms of iron and steel dates from 1874. (It is scarcely necessary to say that natural gas is not used in the manufacture of pig iron.) At the Siberian rolling mill of Rogers & Burchfield, at Leechburg, in Armstrong Co., Pa, natural gas, taken from a well 1200 feet deep, was first used as a fuel in connection with our iron and steel industries. In the fall of 1874 it was announced that during the preceding six months the gas had furnished all the fuel required for puddling heating, and making steam at these works, not one bushel of coal having been used. Between 1874 and 1881 natural gas for puddling was successfully used at the same rolling mill; at the mills of Spang, Chalfant & Co. and Graff, Bennett & Co., in Allegheny County, Pa., and at the rolling mill of the Kittanning Iron Company, at Kittanning, Pa. In each instance the gas used at these works was obtained from wells that were sunk for oil but were found to produce only gas. In 1883 the substitution of natural gas for bituminous coal in rolling mills and steel works received much attention at Pittsburgh, owing to the discovery of natural gas in large quantities at the neighboring town of Murrysville, in Westmoreland County, Pa., but as late as September, 1884, there were in all only six rolling mills and steel works in the United States which were using the new fuel. During the next two years the use of natural gas in the manufacture of iron and steel made rapid progress. In August, 1886, there were 68 rolling mills and steel works which used the new fuel. During the next 15 months still further progress was made. In November, 1887, there were 96 rolling mills and steel works which wholly or in part used natural gas as fuel, and over 100 are now using it. The whole number of rolling mills and steel works in the United States in November, 1887, completed or in course of erection, was 445, of which, as will be seen from the above figures, nearly one-fourth used natural gas as fuel.

Of the total number of rolling mills and steel works which were using natural gas in November, 1887, 57 were located at Pittsburgh and elsewhere in Allegheny County, Pa., 15 were in the western district of Pennsylvania outside of Allegheny County, 7 were in Wheeling or its vicinity in West Virginia, and 17 were in Ohio. The territory in which are located the iron and steel works which use natural gas for fuel extends as far east as Johnstown, Pa., 79 miles east of Pittsburgh. In Ohio natural gas is used in the mills at Youngstown, in the northeastern section of the State, piped from wells in Pennsylvania, and at Findlay and Bowling Green, in the northwestern section of the State, obtained from local wells. In the intervening country between Youngstown and Findlay, which contains many large iron and steel works, including those at Cleveland, natural gas is not used. At Steubenville, Bridgeport, Bellaire, Martin's Ferry, and a few neighboring places on the Ohio side of the Ohio River, natural gas, piped from wells in Pennsylvania, is used in iron and steel works. Natural gas has been found at a few points in the central and eastern parts of Indiana, but at the end of 1887 the supply was so small that no rolling mill or steel works in that State was using this fuel. The gas used in West Virginia is obtained from wells in Washington County, Pennsylvania. Natural gas not having been found in the anthracite coal region or its vicinity, its use has not interfered with that of anthracite coal in rolling mills and steel works, but wherever it is used it displaces bituminous coal. It displaces no other fuel.

Nor has the use of natural gas as a fuel reduced the production of bituminous coal

in any State, not even in Pennsylvania, where natural gas is most used. On the contrary, the production and consumption of bituminous coal in this country have steadily increased in recent years. In nearly every State and Territory, including Pennsylvania, the production of bituminous coal in 1887, according to Mr. Ashburner, was greater than in 1886, while the aggregate for the country at large was much greater. The greatly increased production in 1887 of pig iron manufactured with coke and with coke mixed with anthracite will account for a large part of the increased production of bituminous coal in that year. In 1888 the consumption of bituminous coal for this purpose will be less than 1887. We do not think that the consumption of natural gas in our iron and steel works will increase in 1888. It did not increase in 1887 as much as in 1886.

The remarkable increase in our production of iron and steel in 1886 and 1887 was, of course, possible without the possession of natural gas, but the cheapness and abundance of this new fuel, and the temptation which it offered to enlarge old plants and construct new ones, are influences which have certainly had much to do with the present tendency to glut the market with finished iron and steel products. Natural gas is, however, not now supplied at as cheap rates as a few years ago.

The possession of natural gas, desirable and valuable as it is, does not insure any of the localities which use it in the manufacture of iron and steel against the sharp competition of other localities which do not have it, but which possess other advantages, as, for instance, proximity to markets of large consumption. This fact is well illustrated by a comparison which we recently made of the production of Bessemer steel in Allegheny County, Pa., which includes Pittsburgh, and in Cook County, Ill., which includes Chicago—the former possessing natural gas and the latter lacking it entirely. Chicago made more tons of Bessemer steel ingots in 1887 than Allegheny County, Pa. And it made many more tons of Bessemer steel rails. The figures are as follows: Chicago—ingots, 531,054 gross tons; rails, 439,345 tons. Allegheny County—ingots, 518,694 gross tons; rails, 287,363 tons. Joliet is a near neighbor of Chicago, in the same State, and Johnstown, Pa., is a near neighbor of Allegheny County, the former lacking natural gas and the latter possessing it. Adding the production of Bessemer ingots and rails at Joliet in 1887 to the figures for Chicago, and adding the production of Johnstown to that of Allegheny County, we have the following totals: Chicago and Joliet—ingots, 748,271 gross tons; rails, 642,580 tons. Allegheny County and Johnstown—ingots, 728,797 gross tons; rails, 414,027 tons. Who would have predicted ten years ago that Chicago would make more Bessemer steel in 1887 than Allegheny County, Pa.?

But natural gas, strange as it may appear, has a rival as a cheap and cleanly fuel in water-oil gas produced from petroleum, which is steadily growing in popularity among our iron and steel and a few other manufacturers. It is claimed that this fuel is cheaper than coal or than gas made from it, and that it possesses all the desirable qualities of natural gas, and is far safer. This new fuel possesses also the advantage that it can be produced and used where natural gas cannot be obtained, and even where the cost of coal may be too expensive to justify the use of the latter fuel.

No section of our country possesses a monopoly of all the advantages for producing iron and steel. Pittsburgh has natural gas for its rolling mills and steel works, and is close to the Connellsville coke field,

but it brings its ores long distances. Chicago is nearer than Pittsburgh to Lake Superior ores, but it is hundreds of miles away from Connellsville coke, and it lacks natural gas as a substitute for raw bituminous coal. In Alabama and Tennessee ores and fuel are found in close proximity, and unskilled labor is cheaper than in the North, but much of the pig iron made in these States must be hauled to distant markets at great expense. In New England but little iron and steel in their crude forms is now made, but the skill in their manipulation which has been accumulated in 200 years yet remains. The iron industry of the Rocky Mountain region will always have the stimulus of a home market remote from destructive competition. There is room in almost every section of this great country for the iron and steel industries which we have in late years so wonderfully developed, and which are destined to expand still further as the years roll on.

Triple-Expansion vs. Compound Engines.

Speaking of the adoption of triple-expansion engines by the Union Steamship Company, *Engineering* remarks:

There are now ten steamers of the fleet fitted with the improved engines, and the saving in consumption of coal varies from 16 per cent to 32 per cent., according to the age and character of the ship at the time of alteration. For instance, one of the newest mail steamers only shows a saving at present of 16 per cent, while the Anglian in the intercolonial service shows an increase of 32 per cent. The average saving on the whole fleet is about 21 per cent. of actual consumption. As the bunkers only admit of a part—say two-thirds or three-fourths—of the coal needed on the voyage being taken from England, the saving is on the fuel shipped on the voyage, so that the monetary gain becomes even greater. One of the last vessels converted was the Tartar, which has recently made the "record" passage from Algoa Bay, South Africa, to Plymouth, her gross time being 17 days 6 hours and 15 minutes, and net time 17 days and 52 minutes, and it may be interesting to note the results of coal consumption. Her engines during the passage, we are officially informed, developed 3830 indicated horse-power, the revolutions per minute averaging 64, and the average speed per hour $14\frac{1}{2}$ knots. The coal consumption was equal to 1.6 pound per indicated horse-power per hour. The old engines used to require 1.99 pound per hour per indicated horse-power, and even then the speed was not so great. This is a saving of 20 per cent. on the actual coal consumed.

The Colonel Scranton, a locomotive recently rebuilt from a wood-burner to a culm-burner at the Delaware and Lackawanna shops, at Scranton, has, according to the *National Car and Locomotive Builder*, a new feature that will be a decided convenience to the enginemen. Heretofore the engineer and fireman of locomotives of this make have had difficulty in conversing with each other, owing to the fact that they are so far apart, but this trouble has been obviated in the Colonel Scranton by the introduction of an alarm bell and speaking tube, which render prompt communication possible. The important improvement was introduced by the master mechanic, Mr. Charles Graham, and this is the only engine in the country that has such an outfit.

One of the most successful cable roads in the West is the Olive street branch of Missouri Railroad Company, St. Louis,

Mo. This line has been in operation continuously for the past nine months, and the inspectors report the cable as being in perfect condition and not a strand broken. The entire length of the cable is 24,250 feet, and was made by the Broderick & Bascom Rope Company, St. Louis, Mo.

The Burton Stock Car Works.

The Burton Stock Car Company have an extensive establishment at Wichita, Kan., for the construction of their improved cars for the transportation of animals. These cars are so arranged that their dumb passengers are carried with proper provision for their comfort, and are thus not only treated humanely, but are delivered in good condition at the end of their journey, which is an important consideration, even if they are only consigned to the slaughter house. These cars are covered by a number of patents, issued at intervals from 1880-87, with others pending. The company have a capital of \$2,000,000, and maintain offices at Boston, Chicago, Portland, Me., Washington, D. C., and Kansas City, Mo. J. T. Chamberlain is superintendent of the works, at Wichita, and W. A. Caswell is assistant superintendent. The plant comprises a number of buildings, the most important of which are as follows:

1. The wood-working shop, one-story brick, 125 x 300 feet, iron truss roof, supplied with a great variety of machinery of the most improved pattern; all lumber delivered at the works mill-sawed; 220 horse-power engine, built by the Fitchburg Steam Engine Company; Thomson-Houston electric light plant; will shortly put in an exhaust fan for carrying away shavings, &c.

2. The blacksmith and machine shops, occupying one brick building, 125 x 300 feet, cut into two parts by a partition; 20 forges, one Bement & Miles double shear, one 500-pound Bradley trip hammer, a bolt furnace and bolt-cutting machine, a "bull dozer" and furnace for shaping iron built by Williams, White & Co., of Moline, Ill., a horizontal drill, double-acting Bement & Miles lathe, Bignall & Keeler Mfg. Company's pipe cutter, together with the usual lathes, planers and punches, most of which were made by Bement & Miles; foundations have been laid for a brick addition, 80 x 120 feet.

3. Iron foundry, built of brick, 75 x 300 feet, containing two cupolas. Other buildings comprise a corerom, a brass foundry, a tin shop and a storeroom, each 50 x 60 feet. The tin shop is needed to manufacture watering troughs, with which each car of this system is supplied. No foundry-work, either in iron or brass, has yet been done, but these departments will probably be in operation by January. The force employed at present numbers 175 men, which will soon be enlarged. The capacity of the works is now 10 cars per day. Refrigerator cars are to be added to the line now made and probably street cars will be undertaken later.

Bearing Plates for Rails.—In consequence of the enormous consumption of timber for railroad ties various methods have been experimented with for increasing the life of the ties by reducing the wear close to the rail, and thus enabling softer and cheaper timber to be used. The most promising of these methods is the use of the Servis tie plate, which has been tried on a number of roads since 1886, and which has given satisfactory results. The plate consists of an iron or steel plate, of channel form; this is put on the tie under the rail and hammered down, and the first heavy train brings it to a solid bearing. The flanges cut into the timber and prevent the shifting of the plate. In some

cases it is made narrow, and the spikes are driven at the side; in other cases it is wider, and has holes for the spikes. It has been urged that with one metal rail on a metal plate there would be liability for the former to shift, causing extra strain on the spikes. This objection, however, does not seem to be experienced in practice, as testimonials state that the line is kept in better line and gauge with these plates than when the rails rest directly on cedar ties. These plates are used on the Canadian railways, Maine Central, Fitchburg, New York and New England, West Shore, Manhattan (Elevated) and other railroads.

The Niedringhaus Memorial Building.

Messrs. W. F. and Frederick G. Niedringhaus have at present in process of erection on the northwest corner of Cass avenue and Seventh street, St. Louis, Mo., a structure which will be known as the Niedringhaus Memorial Building. This structure is being erected as a place of instruction and amusement for the employees of the company, and as a fitting tribute to the memory of Walter, son of William F. Niedringhaus, secretary of the St. Louis Stamping Company, whose death occurred about two years ago. The building, which is at present in course of construction, is designed to have a frontage of 65 feet, with a depth of 110 feet, and will be two stories in height, with a French gabled mansard roof. The plans call for a front of pressed brick, with stone trimmings, and wide stone steps leading to the main entrance. The windows are of the Gothic style of architecture, and are sufficiently numerous to render the interior light and pleasant.

In the arrangement of the rooms, an apartment 15 x 20 feet at the right of the main entrance is set apart for the use of the directors; to the left of the main entrance is a library and reading-room, 28 x 20 feet in size, both having high ceilings and windows extending from the floor almost to the ceiling. On either side of these rooms are wide stairs leading to the gallery and basement. In the rear is the lecture-room, an apartment 60 x 69 feet in size, and of an elongated semi-circular shape. The stage, which is planned to occupy a space 25 x 18 feet in size, has on each side class-rooms, which are each 12 x 17 feet in dimensions, and which can be utilized as dressing-rooms in case the lecture-room is being used for amateur theatricals or entertainments of a similar nature. The seating capacity of the lecture-room is 1300. The second story is practically a gallery, with a seating capacity of 400. The front portion of the basement is designed for a dining-room, with accommodations for feeding from 300 to 400 people at a time. It is 50 x 81 feet in size, perfectly lighted by English basement windows. In the rear is a kitchen 22 x 18 feet in size, and along one side adjoining the kitchen and dining-room is a bowling-alley.

It is the purpose of the projectors of this enterprise to erect a gymnasium in the rear of the main structure. The plans, we understand, are not yet completed, but they contemplate everything necessary to a perfectly equipped gymnasium, including baths. It is estimated that the total cost of the building and furnishings, exclusive of the library, will approximate \$20,000. While the building is designed primarily for the use of the employees of the St. Louis Stamping Company, we understand that its privileges may be enjoyed by any eligible person residing in the city. It will be absolutely free to those for whose benefit it is being erected, the running expenses being borne by the Messrs. Niedringhaus.

New Two-Spindle Milling Machine.

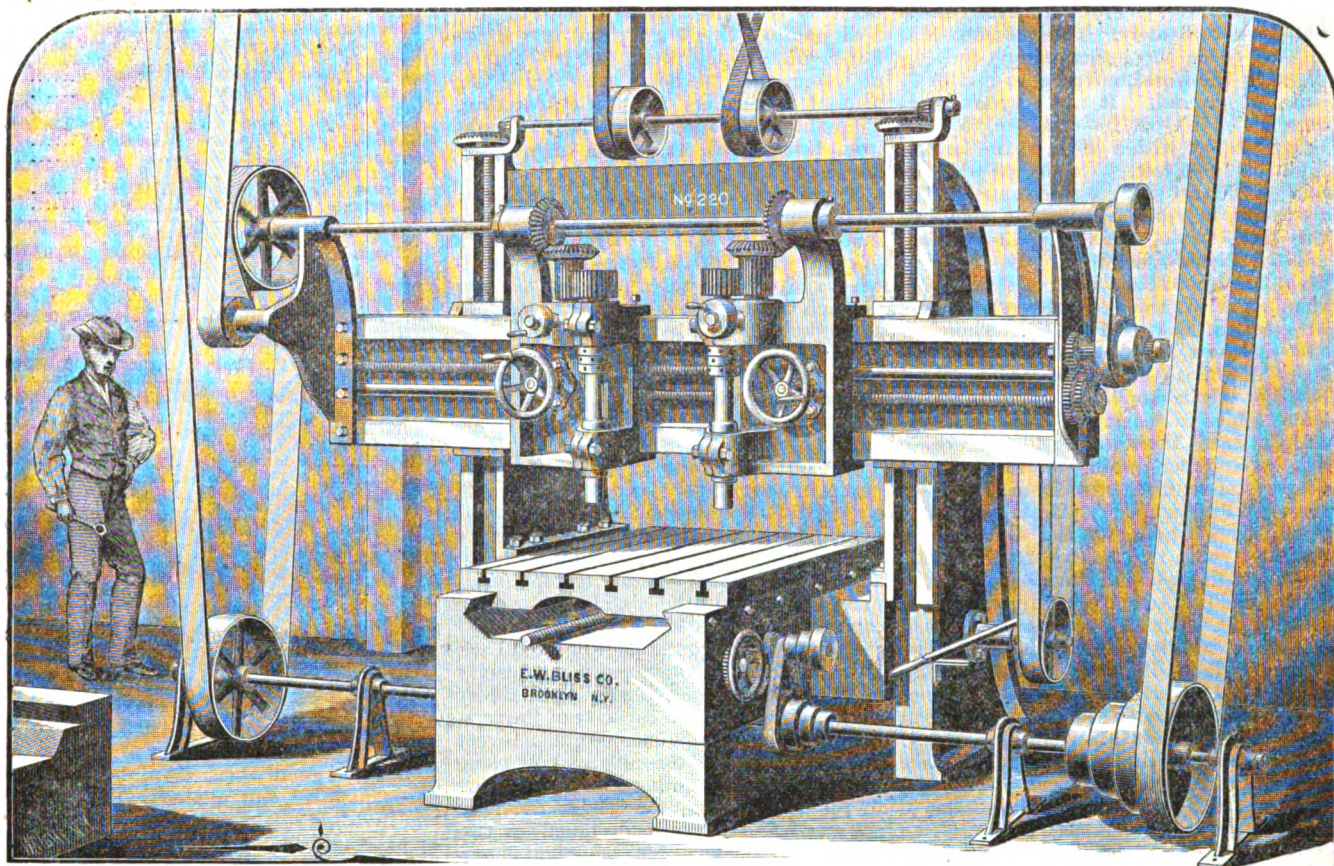
We show, on this page, a milling machine of new design, recently built by the E. W. Bliss Co., of Brooklyn, N. Y., for use in their own works.

As will be seen, the general arrangement is that of a planer, but, in the place of ordinary planer tools are substituted vertical spindles for butt milling. The table has a longitudinal travel of 36 inches, and is fed by a screw, which may be operated by the hand-wheel shown at the right side of the bed, or fed by power, in either direction. Four speeds for feed for the table are provided, and, in addition, there is a power "rapid transit" motion, which is operated to run the table in either direction, by means of the hand-lever shown at the right of the bed. The quick motion is especially intended for

required, and the builders are now filling several orders for machines with 5 to 6 foot lengths of table. The driving-shaft, carried by the cross-head, is spindled its length between bearings, to allow for the lateral motion of the saddles, and is driven from the floor counter-shaft by the familiar arrangement of belting shown, which dispenses with the necessity of a tightener to make up for the vertical adjustment of the cross-head. In some of the machines now in course of construction the arrangement is such as to allow the floor counter-shaft to be dispensed with, and one at the top of the machine to be substituted, which, in some cases, might be considered preferable. By the use of the two spindles on the work for which this machine was designed, and with special attachments to facilitate the setting, this tool is now doing work that heretofore required the use of

Depew on Rates.

Respecting competitive rates on railroad lines, which are causing so much disturbance among shippers of merchandise, more than counterbalancing any advantage arising from temporary reductions, President Depew, of the New York Central, says: "The differential rate is all wrong in theory undoubtedly, but, after several disastrous wars to get rid of the system, ninety-nine one-hundredths of the railroad men of the country believe that there is no other way of promoting staple rates or of protecting railroad investors. A railroad tariff between two points should be as well known and as staple as the postage rate." "I believe," he says again, "that in time the theory to which the country is now committed, that the Government, through an Interstate commission, shall prevent



TWO-SPINDLE MILLING MACHINE, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

running the table back after the cut is finished, and, being entirely independent of the cone feed, both can be in operation at one and the same time, thus saving the trouble of throwing off the cone feed in order to run the table back for starting a new cut. The cross-head is raised and lowered by power, much in the same manner as in a planer, and, in addition, each spindle has an independent vertical adjustment of 2 inches, operated by the hand-cranks shown at the upper boxes on the saddles. Each saddle is capable of independent lateral motion, operated by the large hand-wheel at the front, and has also a power attachment for feeding, supplied with four changes of speed. As in the case of the table, the saddles may be moved independently from the power feed while the latter is in operation. The cross-head is made of sufficient length to allow the saddles to be run out far enough to bring the milling cutters outside of the housings, between which the distance is 54 inches.

The machine illustrated was built for special work not requiring a long table, but the latter can be made of any length

five planers, thus proving itself a most valuable addition to the equipment of a machine shop.

Sometimes the fastenings of crown gear wheel on the upper end of a turbine water-wheel shaft are neglected, and allowed to get loose, and the wheel to slip down and out of gear. It does it gradually until when nearly out of gear, and then if the cogs are pretty well worn the points unable to stand the strain give way, and the whole wheel is stripped.

General Dumont, Supervising Inspector-General of Steam Vessels, reports inspecting 6425 vessels last year, an increase of 305 vessels over the year previous. Nearly 30,000 licenses were issued. There were 202 lives lost by accidents to vessels during the year, a lower number than in any previous year. There were 50,000,000 passengers carried during the year. The expenses of the bureau were \$257,000. He recommends that ferryboats be limited in the number of passengers carried, and that yachts and all small steam craft be inspected.

railroad abuses and extortions and discriminations upon one line, will be extended to legalize a pool, by which method alone precisely the same evils can be stopped when practiced by competing lines against one another. So far as the public is concerned, all routes from one point to another are one, and a system which simply prevents one line from discriminating in favor of one of its own customers as against one another, and on the destruction of the pool promotes still more violent discriminations to one shipper as against others by different lines, has enormously exaggerated the evils which it was created to remedy. The whole of the existing trouble is the impossibility of railroads legally forming a pool. A recognition of a proper system will settle the whole difficulty in 24 hours."

The Interstate Commerce Commission has addressed the New York Central Railroad asking for information regarding the illegal cutting of rates which has been alleged against its competitors. Chairman Cooley is desirous of proving the facts with a view to ascertaining if there is sufficient ground for proceedings by the

Federal Commission. It is understood that the Central has replied that it can furnish no specific evidence from the nature of the case, but has been satisfied, from the course of its traffic, that the tariff was not being lived up to by its rivals.

Calumet and Hecla Stamp Mills.

We are indebted to the *Houghton Mining Gazette* for the following description of this plant.

The Calumet and Hecla stamp mills, at which the immense product of the mine is stamped and made ready for smelting, are situated at the village of Lake Linden. The site occupied consists of lot No. 4, comprising about 25 acres of land, which is occupied with their buildings, docks, yards, &c. There are two separate stamp mills, the Calumet and the Hecla, into which, however, the rock from the mine is put indiscriminately. The Calumet Mill is said to be the largest single dressing plant in the world, covering as it does 1½ acres of ground. It was very much enlarged last season, its total length now being 460 feet, with a width of 105 feet, its height being 66 feet. Connected with the mill on the east side are three annexes 100 feet wide, in which is the slime plant for this mill, two of them being 75 feet deep and the other 50 feet deep. Its stamping plant consists of eight head of stamps now running, with three new stamps in process of erection, making 11 in all. There are 272 jigs now in operation and when the three new head of stamps are completed 374 jigs will be employed. There are 28 slime tables in use and with the three additional heads there will be 44. There are also two Heberle mills for recrushing a coarse gangue, discharged from the rough sieves and rejiggers. The Hecla Mill building is 300 feet long, 105 feet wide and 66 feet high, with two annexes 100 feet wide by 70 feet deep, one of them being erected during the past season and will contain the slime plant. The mill operates seven head of stamps, 238 jigs and will have 28 slime tables, which will probably be running before the close of 1888. The slime tables are all double deckers without a dead head and have been shown to yield 60 per cent. more ingot from the same amount of slime than tables using a dead head. The mill also contains two Heberle mills similar to those in use at the Calumet Mill.

During the last year the whole method of handling the mineral in the matter of sending to smelting works has been changed; where it was formerly sent in barrels it is now sent in cars, the first cars being sent from the Hecla mill in December, 1887, and from the Calumet mill in July, 1888. There are now 10 cars employed in carrying the mineral from the Hecla mill and 15 from the Calumet; cars hold about 5 tons each. The cars are loaded in the mills and run directly into the mineral storehouse at the smelting works over an elevated track, dumping their load into bins for its reception. In the old method of sending the mineral in barrels about 4000 barrels were used each month. This new system was originated by the Calumet and Hecla Company, and as yet is used nowhere else. The cars bringing the rock to the mills from the mine to be stamped run into the upper story of the mill over an elevated track and dump their load into the rock bins, the bin capacity of the two mills being 10,000 tons.

The stamps used at the mills are the Leavitt stamp. The present capacity of the stamping plant is about 3200 tons rock per day, and when the three additional heads are working the total capacity of the two mills will be about 3900 tons rock per day. Recently, as a matter of experiment, a solid anvil has been placed under No. 1 Calumet head, the anvil weighing

about 57 tons, resting on the main foundation. So far this solid anvil is working very satisfactorily and is crushing 260 tons per day without an increase in the consumption of steam. This shows a gain of from 100 to 120 tons over the old style of "Ball" stamps and an increase of about 40 tons over the same head when using spring timbers as a foundation for the anvil. In addition to the driving engine Wabeek, which will be mentioned later, each mill has its own driving engine. So if any accident should happen to the driving engine Wabeek or to the wire rope transmission, the small driving engine could be at once started and a stoppage of the mill avoided. The stamp mill boiler house is a building 210 feet long by 70 feet wide and contains 10 fire-box boilers, with a capacity for 14. The steam is conveyed to each mill through a 24-inch pipe running through a 7 foot tunnel. The feed plant is comprised of two Worthington feed pumps, 12 x 6 x 10, and one Hyatt 8-foot filter, which filters 200,000 gallons of water each 24 hours, that being the amount the boilers are now evaporating. The chimney for these boilers is of wrought iron, brick lined, 12 feet in diameter on the inside and 185 feet high.

There are two sand-wheel buildings, each about 60 feet square, in which are sand-wheels 43 feet in diameter with a bucket width of 6 feet. These sand-wheels lift all the water and sand passing through the mills to a height of 35 feet into a launder 4 feet wide which conveys it to the lake. The electric light plant consists of two No. 7 Brush dynamos supplying power for 60 odd lamps. Another is soon to be placed to be used on an outside circuit.

The water-works building contains three pumping engines—"Ontario," which is a vertical double-expansion compound pumping engine with a nominal capacity of 20,000,000 gallons, but is now pumping 23,000,000 gallons; "Erie" pumping engine, same type as the "Ontario," with a capacity of 10,000,000 gallons, and "Huron," a horizontal pump geared back on to a horizontal engine with a capacity of 20,000,000 gallons, used as an auxiliary engine. The aggregate capacity of the present water-works is 50,000,000 gallons every 24 hours, of which the mills are now using about 33,000,000 gallons. The addition to the water-works, for which the piles are now being driven, is designed for two vertical, triple-expansion compound pumping engines with a pumping capacity of 40,000,000 gallons each per 24 hours; only one, however, will be placed the coming season. These engines are to be called the Winnipeg and Michigan, the latter to be the one first set up, part of it being already on the ground. The foundation of the building will be laid as early in the spring as practicable. The aggregate capacity of all the pumps will be 130,000,000 gallons every 24 hours; the mills, however, will probably not need much over 60,000,000 gallons, the plant being duplicated for the sake of safety. In the present water works building is also the driving engine Wabeek, mentioned previously, of the same general type as the Ontario. The engines, stamps, boilers and sand-wheels were all designed by Mr. E. D. Leavitt, Jr., the company's consulting engineer. The boiler plant for the water works consists, for the present, of two 90-inch fire-box boilers 34 feet long, carrying a pressure of 120 pounds. Two more boilers of the same size, but to carry a pressure of 180 pounds, are to be added, one of which is to be placed this fall. The addition for which the piles are now being driven is to be 70 x 64 feet, and will be built of iron as far as practicable. The building will be supplied with a 30-ton traveling crane, for the purpose of erecting the heavy machinery. Mr. F. G. Coggin, the superintendent in charge, has

held his position with the Calumet and Hecla Company nine years, during which the entire stamp mill plant, as at present arranged, has been set up under his supervision and largely in accordance with his plans.

The World's Wheat Crop of 1888.

The *Paris Echo Agricole* presents the following estimate of the production, exports and imports of wheat of the world for the current crop year:

Countries.	Probable production, bushels.	Probable imports, bushels.	Probable exports, bushels.
Russia.....	248,060,000	.....	109,780,000
France.....	244,216,000	68,600,000	.....
Austria.....	.....	.....	.....
Hungary.....	156,408,000	.....	16,464,000
Spain.....	115,088,000	6,860,000	.....
Italy.....	101,528,000	38,418,000	.....
Germany.....	82,520,000	30,184,000	.....
United Kingdom.....	62,632,000	150,920,000	.....
Turkey.....	39,046,000	.....	5,495,200
Roumania.....	21,952,000	.....	13,720,000
Bulgaria.....	13,720,000	13,720,000	.....
Portugal.....	6,860,000	1,920,000	.....
Greece.....	4,684,000	2,744,000	.....
Servia.....	4,390,400	.....	1,372,000
Holland.....	4,116,000	12,348,000	.....
Denmark.....	3,567,200	.....	.....
Sweden and Norway.....	2,744,000	2,744,000	.....
Switzerland.....	1,646,400	11,732,000	.....
Total bushels.	1,111,868,000	340,250,000	146,811,200
United States and Canada.....	409,320,000	.....	96,040,000
Chili and Arg. Republic.....	27,440,000	.....	10,968,200
Totals...	1,548,628,000	340,250,000	253,824,400
India.....	260,680,000	.....	27,440,000
Asia Minor.....	37,044,000	.....	2,744,000
Persia.....	21,952,000	.....	2,744,000
Syria.....	13,720,000	.....	1,372,000
S. E. Asia.....	8,252,000	.....	1,372,000
Totals...	1,306,256,000	340,250,000	289,506,400
Australia.....	38,416,000	.....	12,348,000
Algeria.....	19,208,000	.....	2,744,000
Egypt.....	13,720,000	.....	4,116,000
Grand totals..	1,977,600,000	340,250,000	308,714,400

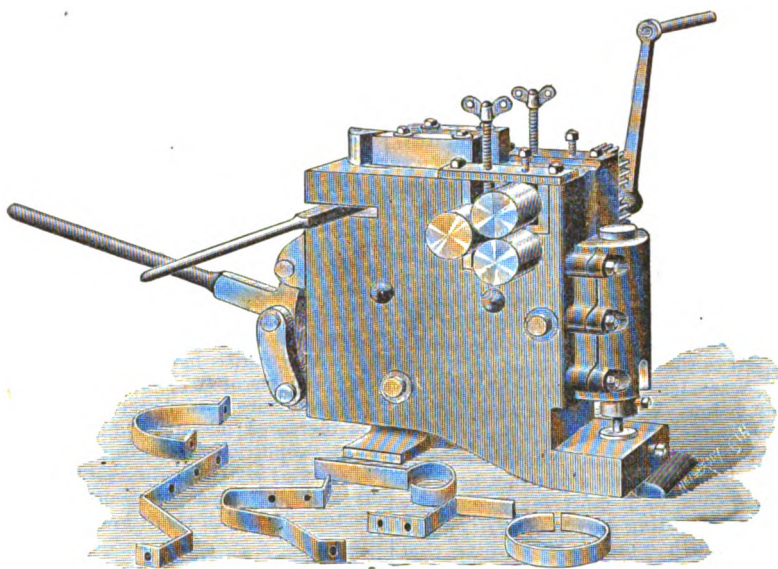
The deficit is only 31,535,600 bushels, according to the foregoing statement. An English estimate makes the deficit 71,618,400 bushels. The continent of Europe in 1887 had a good wheat crop, both as regards quantity and quality. The visible and invisible stocks August 1, 1888, were in excess of any deficit yet established. There was in France alone, exclusive of flour, on August 1, 1888, 32,728,000 bushels of wheat, according to the author of the French estimates.

Walston Coke in Cleveland.—It is stated that the Connellsville coke operators have recently encountered a rival for their product in the market at Cleveland, Ohio. The coke manufactured by the Rochester and Pittsburgh Coal and Iron Company has recently been introduced into that market. An analysis of their coke shows a decidedly good average. The headquarters and mines of the company are at Walston, Jefferson County, Pa. They control about 20,000 acres of coal lands. The lower Freeport, which in many localities is worthless, here thickens, giving not less than 6 feet of clean coal. The capacity of the mines at Walston and Adrian is about 7000 tons a day. There are over 700 ovens at Walston and 450 at Adrian. The coke reaches Cleveland by way of Salamanca and the New York, Pennsylvania and Ohio.

The number of locomotives in use in German railroads was 12,450 in the year 1885-86, the average age being 12.49 years. Fifty engines built previous to the year 1850 were still in use at the date referred to, the oldest of which dated from 1845.

Combination Machine.

Messrs. George C. Keene & Co., of Cincinnati, Ohio, are offering the trade a combined shear, punch, band-iron former and bending machine adapted to the use of sheet-metal workers. A general idea of the appearance of this machine may be gained from an inspection of the engraving presented herewith. By means of the lower lever, shown at the left of the engraving, the shear attachment placed directly forward of it at the lower side of the body is readily operated, as is also the punch attachment, shown at the right. By means of compound levers fitted with links and steel pins having a relative bearing to each other all unnecessary strain on the parts is avoided. The punch and shear attachments work in unison, the latter being so arranged as to enable the operator to slit iron if desired. The second lever handle shown in the cut operates the band-iron bending attachment placed above it. The forming attachment consists of three steel rolls 3 inches in diameter, adjustable by means of large thumb-



COMBINATION MACHINE, BUILT BY GEORGE C. KEENE & CO.

screws placed above and operated by a geared crank.

The machine is made in one size only, weighing 250 pounds. The body measures 24 x 24 x 6 inches, and is adapted to cut, form and punch from $\frac{3}{8}$ inch to the lightest bar iron 2 inches wide, the working parts being concealed from view. It is kept free from obstruction, works with perfect ease, and, taken as a whole, constitutes a convenient and durable combination machine.

Ohio's Workshops.—The fifth annual report of Henry Dorn, chief inspector of shops and factories, was filed with the Governor recently. Mr. Dorn recommends among other things that stationary engineers be compelled to pass a thorough examination as to their fitness, and that owners of steam boilers be compelled to insure them; that the child labor law be so amended as to prohibit the employment of children under 14 years of age. A summary of the statistics of the report shows that there are 164,675 employees engaged at work in 3271 shops inspected, in which there were 1386 changes for bettering the condition of the workmen ordered. In the five largest cities of the State there is a total of 95,888 employees in the shops inspected. Of these, 36,681 are in 730 shops in Cleveland, 29,133 being males, 4686 females, and 2862 minors. In Cincinnati there are 33,788 employees in 717 shops, 24,340 being males, 7032 females, and 2416 minors. Columbus has 8802

employees in 228 shops, of whom 7260 are males, 1240 females, and 302 minors. Toledo's 7560 employees are in 159 shops, the males being 5791, females 1225, minors 544. Dayton, with 129 shops, has 9057 employees, of whom 6404 are males, 1736 females, and 917 minors. It must be understood, however, that the above figures are only for the shops inspected, and do not include a large number in each of the cities that the inspectors were unable to visit.

Sheffield Cutlery.

Prince Krotapkin, writing in the *Nineteenth Century*, says: "The Sheffield cutlery—one of the glories of England—is not made by machinery; it is chiefly made by hand. There are at Sheffield a few firms which manufacture cutlery right through from the making of steel to the finishing of tools, and employ wage-workers, and yet even these firms—I am told by my friend, E. Carpenter, who kindly gathered for me information about the Sheffield trade—let out some part of the work to the small

masters. But by far the greatest number of the cutlers work in their homes, with their relatives, or in small workshops supplied with wheel power, which they rent for a few shillings a week. Immense yards are covered with buildings, which are subdivided into series of small workshops. Some of them cover only a few square yards, and there I saw smiths hammering, all the day long, blades of knives on a small anvil, close by the blaze of their fires. Occasionally the smith may have one help or two. In the upper stories scores of small workshops are supplied with wheel power, and in each of them three, four or five workers and a master fabricator, with the occasional aid of a few plain machines, every description of tools—files, saws, blades of knives, razors and so on. Grinding and glazing are done in other small workshops, and even steel is cast in a small foundry, the working staff of which consists only of five or six men. When walking through these workshops I easily imagined myself in a Russian cutlery village, like Pavlovo or Vorskma. The Sheffield cutlery has thus maintained its olden organization, and the fact is the more remarkable as the earnings of the cutlers are very low as a rule; but, even when reduced to a few shillings a week, the cutler prefers to vegetate on his small earnings than to go as a wage laborer in a house. The spirit of the old trade organizations, which were so much spoken of 25 years ago, is thus still alive."

The Tamarack-Osceola Copper Mfg. Company.

A little over a year ago the parties interested in the Tamarack and Osceola mines on Lake Superior began the erection of a rolling mill for manufacturing copper under the name of the Tamarack-Osceola Copper Mfg. Company. The *Houghton Mining Gazette* in a recent issue gives the following details of the present status of the enterprise:

At the rolling mill a shipment has just been made of 150 tons wire rod. The sheet mill is kept very busy. A new furnace has just been added for the 108-inch rolls and a set of 20 x 60 cold rolls is being erected. Much of the machinery for the new wire mill has already arrived on the ground. The engines are expected daily. Steam will be supplied from the rolling-mill boilers, to be conveyed through an overhead pipe. It looks now as if it would only be a matter of a short time when the wire mill will be ready to start up for active work.

The work of erecting the walls for the new smelting buildings is completed, and the roof, which is to be of iron, is being erected. The buildings, of which there are two, set back from the shore of the lake some little distance, the nearest one being about 250 feet distant from the projected dock line and parallel to the same, leaving plenty of room for a third building. They are built of stone taken from the quarry west of Hancock, their dimensions being 80 x 130 with a height of 20 feet to the eaves. At present they will contain five furnaces, three being placed in the one next to the lake and two in the other. The furnaces, boiler plant and steam pipes will be placed during the winter, the furnaces being somewhat larger than any heretofore used in the Lake Superior district. The cupola building will not be erected until spring. Stone for the building of the same is, however, on the ground. The works are so arranged that they may be duplicated at any time upon the opposite side of the spur track, which runs from the main line of the Hancock and Calumet Railroad to the rolling mill, which allows for the lay-out of six furnace buildings in all. The smelting department of the company will be under the charge of Mr. W. F. Robertson, of Montreal, formerly in the employ of the Orford Copper Company, of New York, and later engaged upon furnaces in Spain. The company started in on the work of erecting their new buildings late in the season, but have been particularly fortunate as to weather.

Gem Furnace.—John W. Hoffman, Philadelphia, receiver of the Shenandoah Iron Company, who built the Gem Furnace at Milnes, Va., has issued a well-written description of the ore property of the company, which is now being offered for sale. A letter is also printed from A. C. Kroman, manager of the furnace, who suggests certain improvements chiefly in the direction of washing the ore from certain banks, and in the direction of lowering the bosh of the furnace. With the improvements thus suggested carried out, he states that iron can be made at the following figures:

$\frac{1}{2}$ ton purchased ore @ \$2.75.....	\$1.37
$\frac{1}{4}$ ton own ore @ \$1.75.....	3.06
$\frac{1}{4}$ ton coke @ \$3.....	3.37
1 ton limestone @ 50¢.....	.50
Labor.....	2.00
Oil, grease, waste, tools and lamps.....	.50
Management, office expenses.....	.37

Total cost at furnace.....\$11.17

He states that the furnace would average 125 tons of iron daily.

The Lake Erie Iron Company, of Cleveland, Ohio, will erect a furnace with working hearth 7 x 14 feet, for heating iron for the 9-inch train.

Legal Decisions.

WATER COURSES.—DEFECTIVE SUPPLY FOR MILLS.

H. in operating his mill had a full supply of water from the stream it was on for nine months in the year, but for the remaining three months there was a great scarcity, and he had constructed a reservoir which could not be filled except by the flowing of the stream for three or four days. In the dry season H. would use the water from the reservoir when it was full, and then resort to the steam-power he had until the reservoir became again full. By taking this course H. deprived the mill-owners below him on the stream of the accustomed flow whenever he turned the water into his reservoir; and when he used the water the ponds below, being small ones, were quickly filled, and much water was wasted over the dams. The previous owners of H.'s mill used both steam and water in the dry season, and so permitted the stream to run undisturbed. M., one of the mill-owners below, being unable to get any redress from H., brought a suit to enjoin him from preventing the usual flow of the stream, and the Supreme Court of Errors of Connecticut, in deciding the case—*Mason vs. Hoyle*—on appeal, in favor of M., through Judge Loomis, said: "The rule that now obtains in all jurisdictions, as recognized by all the authorities, is that the use made by mill-owners of a stream must, in relation to other mill-owners on the same stream, be a reasonable use. Whether the use be reasonable must depend less upon any general rule than upon the particular circumstances of the case. But there are certain conditions essential to a reasonable use so long recognized by common consent, or so obviously just, that we may safely generalize with regard to them. The use must be as near as possible an equal use, or rather an equal opportunity to use. Every owner improving a mill privilege has a right to consider the law as protecting him against any unfair use by any other owner who may establish a mill above him. The term 'unfair use' is the equivalent of 'unreasonable use.' The defendant insists that we cannot consider the fact that he has steam power in his mill in determining this controversy, but we differ from him, as we are of the opinion that with the proper use of this power he can get a reasonably advantageous use of the water-power, and let the stream run on. Besides, the immemorial local custom down to H.'s time to let the water go on unimpeded to the mills below has an important bearing upon the question here. And there remains the further significant element in the case, that the benefit to defendant is much less than the damage to plaintiff in stopping the usual flow; for while a full reservoir will run the former's mill but five hours, the latter is interrupted in the use of his mill for about as many days. The injunction must be granted; otherwise the whole beneficial use of the stream will be absorbed by the defendant."

SUNDAY LAWS.

H. was indicted and convicted for working on Sunday, in violation of the statute forbidding any labor on Sunday. His offense was operating his ice factory on the first day of the week. It appeared on the trial that the closing of the factory from midnight on Saturday to midnight on Sunday would require, on Monday, the reduction of the temperature throughout the entire day (24 hours) before any ice could be drawn, and that then the first ice drawn from the molds would be spongy and unvaluable. The machinery is very sensitive to the heat of the sun, and, during the heat of the summer, the temperature in the brine-vats will rise from 16° to 20° in a day, and it requires more time and labor

to recover a degree above 10° than below. The case on appeal—*Hennersdorf vs. State*—was decided, by the Court of Appeals of Texas, in favor of the defendant below, on the ground that he could work the factory on Sunday as a work necessity, which was provided for under the law. Judge Hart, in the opinion, said: "It will not do to limit the word 'necessity' to those cases of danger to life, health or property, which are beyond human foresight or control. On the contrary, the necessity may grow out of—or, indeed, be incident to, a particular trade or calling, and yet be a case of necessity within the meaning of the act; for it is no part of the design of the act to destroy or impose onerous restrictions upon any lawful trade or business, and hence it has been held, in a sister State, under a statute like our own, that it is lawful to keep a blast furnace at work on Sunday, because it is a work of necessity. It is evident that the work of the defendant here was a work of necessity, and the conviction must be reversed."

SALE—TENDER OF GREATER AMOUNT OF GOODS.

An iron company offered P. some nut and bolt shop scraps, saying that they had 30 or 40 tons to sell, and he offered 87½ cents per hundred for the iron delivered at his wharf. This offer was accepted a day later, and immediately the company carried to the wharf 58½ tons, and tendered the cargo to P., who declined to take the amount bought, on two grounds: first, that it was not iron contracted for; second, that a tender of 53½ was not a tender in fulfillment of a contract for 30 or 40 tons. A judgment was recovered by the company, the court below having instructed the jury in their favor. The case—*Perry vs. Mount Hope Iron Company*—on appeal to the Supreme Court of Rhode Island, was adjudged in favor of the defendant below—*Perry*. The Court, in the opinion, said: "The contract for the sale of 30 or 40 tons of iron would naturally be understood to mean a contract between 30 and 40 tons, or at most for a quantity not much exceeding 40 tons. Fifty-three tons is so much more than 40 tons that we do not think the jury were warranted in finding that Perry agreed to purchase that amount. The cases cited by the defendant (*Perry*) show that, as a general rule, the buyer is entitled to refuse the whole of the goods tendered if they exceed the quantity agreed on, and the vendor has no right to insist upon the buyer's acceptance of all of the goods tendered, or upon the buyer selecting his purchase out of a larger quantity delivered."

Copper Stocks in France.—The London *Economist* prints the following table showing the accumulation of copper in tons since the commencement of the year, the returns being those for the end of each month:

	Havre.	Rouen.	Dunkirk.	Paris.	Other places.	Totals.
January.....	22	1,016	.....	.....	362	1,400
February.....	28	965	.....	.....	463	1,454
March.....	712	968	.....	.....	.....	1,678
April.....	1,144	968	.....	.....	.....	2,110
May.....	1,144	968	.....	.....	26	2,136
June.....	3,531	1,021	.....	.....	26	4,578
July.....	6,731	4,500	1,169	498	26	12,924
August.....	10,805	5,312	1,169	1,001	102	18,389
September....	18,265	5,312	1,169	1,000	107	25,852

It will be observed that a considerable part of the growing copper stocks is being transferred to France.

The total tonnage launched on the Clyde for the past ten months was 223,053 tons, exceeding greatly the total for the same period in the three preceding years, although it falls short of the production of

the years when shipbuilding was at its greatest prosperity. This year's total is 60,000 tons in excess of 1887, over 75,000 tons in excess of 1886, and 71,000 tons in excess of 1885. And it exceeds the total output for these three years by 38,600 tons, 51,500 tons and 31,500 tons respectively. The total production for the present year is estimated at 260,000 tons.

A Great Silver Mine.

The Granite Mountain mine, of Montana, ranks among the great silver mines. The total gross product of the property from 1885 to July 31, 1888, has been 7,606,515 ounces of fine silver, 3185 ounces of fine gold, and 537 tons of ore shipped to smelter, from all of which \$7,776,840 have been realized. To July 31 the expenditures were as follows:

For mills, buildings, roads and other permanent improvements, lands, ranches, and lode claims and water rights, say.....	\$562,500
For unconsumed supplies, as per inventory.....	185,000
For labor and supplies consumed, say.....	1,464,264
For bullion and smelting ore, freight, and refining charges, say.....	214,167
For miscellaneous expenses, including home department, say.....	108,000
For 43 dividends returned to stockholders.....	4,800,000
Total disbursements, say.....	\$7,368,931
Cash on hand in St. Louis and in Montana, and bullion en route and sold, July 31.....	412,409

From the above it will be seen that the dividends returned to stockholders are about 62 per cent. of the gross output, leaving as an extra asset the value of the plant and unconsumed supplies, which were taken in inventory July 31 at \$581,579. In the spring the new 90-stamp mill will be in operation. It is intended to utilize in three mills (aggregating 160 stamps) a larger proportion of low-grade ore than heretofore, and hence the increased output of bullion will not be in proportion to the increased milling capacity. By second-class or low-grade ore is meant ore assaying under 75 ounces per ton, of which there are large quantities.

Carriers and Shippers.

Each of the European Continental powers has provided for some form of advisory railroad commission through which the railway managers and representatives of the commercial, industrial and agricultural interests are brought together for purposes of conference on disputed questions affecting rates and service. Arguing in favor of the adoption of a like system in the United States, the *Commercial Bulletin* says: "The Interstate Commerce law has discouraged conferences between carriers and individual shippers. Never before have such consultations been so difficult or so unproductive of good results. The law aims at the establishment of general principles and inflexible rules, and leaves as little room as possible for discretionary action by the carrier in deference to the necessities of individual shippers or localities. By discouraging this individual correspondence and consultation the law has increased the necessity for conferences on a broader scale. It has compelled commercial bodies throughout the country to take up freight-rate questions, to study the transportation situation and to champion the cause of shippers. It has had the effect of bringing new commercial bodies into existence for this very purpose. A large proportion of the cases brought before the Interstate Commerce Commission originate with such bodies, and railroad managers have been compelled to recognize the necessity for dealing with such organizations as they previously did with individuals under the old system of secret agreements, &c."

THE WEEK.

The National Board of Trade, President Frederick Fraley, of Philadelphia, in the chair, held a two-days' session in Chicago last week and adopted resolutions in favor of the suspension of silver coinage, granting subsidies to American steamships for carrying the mails, strengthening our coast defenses and favoring the restriction of immigration. The next annual convention will be held in Louisville.

The associated taxpayers up town are solidly arrayed against building the proposed Quaker Bridge dam, which they say would cost \$100,000,000 and prove worthless.

Progress is now being made on the abutments and piers of a large suspension bridge, which will cross the Hudson River from Anthony's Nose, above Peekskill, to Fort Clinton. The bridge is being built by the Hudson Suspension Bridge and New England Railway Company, and is intended to form a connecting link between the New England Railway system and that of the West, with the purpose of opening up to a greater degree the New England market for the coal fields of Southern New York and of Pennsylvania. The direct connection will be with the New York, Lake Erie and Western and indirectly with the Lehigh Valley and other roads and the Pennsylvania system. General Serell is the engineer-in-chief of the bridge, which, it is claimed, will be larger than the Brooklyn Bridge. The span of the latter will be exceeded by 25 feet, according to statements of representatives of the company. The wire to be used in the manufacture of the cables, it is said, will be of greater strength, individually, in proportion to their section, than any heretofore used, being equal to a strain of 5400 pounds each. Sixty-one of these strands will be combined in a cable. The cables are said to be of Roebling & Sons' manufacture.

The Detroit Tunnel Company has been incorporated, with a capital of \$1,500,000, with the object of building a tunnel beneath the Detroit River for railroad purposes, the expense for the entire work to be divided equally with a Canadian company, each organization to build up to the intermediate national boundary line. Tracks will run from the tunnel to the northern end of the city and there connect with every railroad entering Detroit. The company will lease its tracks and tunnel privileges to the railroad companies.

Mr. Eastman, whose shipments of live cattle from New York to ports in the United Kingdom amount to several millions of dollars annually, is about to retire from business with a handsome fortune. He is a native of New Hampshire and commenced as a 'longshoreman.

Chief Engineer Green of the Dock Department has made an examination of the shore line on the North River side, with the object of extending piers to adapt them to the increased length of steamships in the European trade, and has decided to apply to the Legislature for such a modification of the water-front as will permit the addition of 50 to 100 feet to many of the piers between Castle Garden and pier No. 47, near Christopher street. By this means the department hopes to retain such a portion of the commerce and business of the harbor as naturally belongs to it as the business center.

The Silk Association of America estimates the annual value of the silk goods manufactured in the United States at \$45,000,000. The invoice value of the manufactures of silk imported last year was \$33,350,928, which, with the duty added, would be about equal to the value of the

domestic manufactures. Consul Seymour, at Canton, China, reports that the silk production will, this year, fall off over 50 per cent. owing to the floods, and that Europe and America will not get more than 10,000 bales, instead of 21,000 usually sent.

A struggle between the New Jersey Central and Lehigh Valley Railroad Companies for right of way in Jersey City at a point known as "the Gap" has caused the interposition of the local authorities. One of the contestants sunk several stone-laden canal boats, as a foundation for the road-bed.

A State commission to consider the project of establishing industrial schools in Pennsylvania met in Pittsburgh last week. Dr. Atherton, the president, who has made a tour in Europe to gather information respecting the workings of the system there, said the commission will resist any measure looking toward the teaching of trades in the public schools, but it will insist that the State incorporate manual training as an integral part of the common school system and provide for a teaching force. After discussion, resolutions were adopted in harmony with these views.

A violent explosion of gas occurred on Friday morning in the large dry goods store of Waller & Welsh, in Yonkers, caused by a defective main in the street. The gas was ignited by a lamp introduced by plumbers in their search for the leak, and instantly the store was in flames. The damage is estimated at \$14,000.

The Treasury Department has authorized the allowance of drawback on exported Hungarian nails manufactured at South Haver, Mass., wholly from imported steel shearings or steel plate scraps. The drawback is to be equal in amount to the duty paid on the imported material, less the legal retention of 10 per cent.

The flouring mills at Minneapolis are shutting down on account of the unprofitable relative position of the flour and wheat market, there being a tendency to a glut of the former, while the prices of grain are supposed to be abnormally high. St. Louis and Milwaukee mills are taking like action.

The Baltimore and Ohio Railroad Company are said to have formed a new scheme for getting through to New York by means of connections with the North Pennsylvania Railroad and the Reading's New York line.

The first annual report of the first railway in China has been issued. The line runs from Tongsan to Yungchong, in the province of Chihli, in North China. Its length is about 27 miles, and it owes its existence to the Kaiping coal mines. The net profits were \$24,500. A branch is being constructed to Tientsin, and it will soon be extended to Peking.

The State Department has been informed of the passage of a law by Ecuador allowing foreign vessels to enter their coasting trade.

Congress convenes on Monday, December 3—ten days hence.

A cable will be substituted for horsepower by the Third Avenue Railroad Company, a majority of property owners on the line of the road having approved of the change. The proposed cable road to extend south to the City Hall from 125th street is promised within a year.

In the United States Circuit Court at Boston, 14th inst., the patent safety-valve suits against the cities of Haverhill, Lynn, Salem, Newburyport, Chelsea, Somerville, Lawrence, Cambridge, Fall River, Taunton and New Bedford, brought by Ruel C. Philbrook and others, were decided in

favor of the defendants under instructions by Judge Colt. The decision was rendered on the ground that the State statute of limitation applied to patent suits. In these cases action was brought more than six years after the time when the right to do so began.

The Boston boot and shoe trade had a banquet last week at which addresses were delivered by ex-Governor Claflin and others, showing that notwithstanding the large increase in shoe manufacturing in the West there has been a steady gain in the East. There are about 160,000,000 pairs of shoes made annually in the United States, and of these 100,000,000 pairs are made in New England. The shoe jobbing business has increased about fivefold in 30 years. Sales in Boston in 1887 amounted to \$16,000,000.

The expediency, not to say necessity, for fostering the export trade in manufactured cottons is being pressed upon public attention in some quarters in prospect of a glut in the home market when manufacturing in the South shall have become more fully developed. Last year there were 60,000 bales of sheetings, worth \$3,000,000, and 30,000 bales of drillings, worth \$1,350,000 exported to China, and to the other countries nearly as much more, and this in the face of active competition with England and Germany in the same lines of goods and in the face of obstacles to transportation, exchange and insurance that no other manufacturing country had to contend with. Just now the export trade in cottons is rather dull owing to the high prices prevailing in the domestic market. But for the absence of direct lines of transportation this trade would be very much greater, particularly to South America.

The Seward bronze statue, one-half larger than life size, was cast at Chicopee, Mass., and was unveiled at Auburn on the 15th inst.

Startling figures respecting the sugar trust are given "by a prominent member of the trade," to the effect that the people of this country must pay \$30,000,000 more a year than formerly for their sugar, and that just that much more money goes into the coffers of the 11 millionaires who constitute the sugar trust. The very first month the sugar trust was in full working order—in January last—it arbitrarily advanced the price of refined sugar nearly 1½ cents a pound. For instance, in January, 1887, granulated sugar was selling at 5½ cents a pound, and in January last, the corresponding month, the sugar trust had forced it up to 7½, a raise of 1½ cents. The following table from a recognized authority, the trade bulletins of Willett & Hamlin, gives the figures which prevailed during each month, as reported from week to week:

1887. Cents.	1888. Cents.
January 5 11-16	January 7½
Feb'y 5 11-16 to ¾	Feb'y 6½ to 7 1-16
March 5 11-16	March 6½
April 5½	April 6½
May 5 11-16	May 6½
June 5 13-16	June 6½ to 13-16
July 5 13-16 to 15-16	July 7 1-16 to 13-16
August 5 15-16 to 6½	August 7½ to 6½
Sept 6 7-16	Sept 7½ to ¾
October 5½ to 6½	October 7½
Nov. 6½ to 11-16	Nov. 7½

It is seen from the foregoing that the average advance in the price made by the sugar trust has been more than 1 cent a pound.

The Manhattan Elevated Railroad last year earned \$8,673,871, and the net earnings were \$3,472,821—increase, \$340,609. Passengers carried, 171,529,789—increase, 12,500,000.

The Minnesota State Board of Prison Inspectors are seeking work for convicts, and "were thinking somewhat seriously of

manufacturing bolts, but found upon investigation that the price of that article is regulated by a trust, with headquarters in New York, and no individual or firm can purchase bolts of the corporation without stating that they have bought of no outside concern since ordering their last consignment." The desire is to avoid antagonism with the products of free labor.

It is claimed that the Pacific Mail Steamship Company stand very little chance of getting any subsidy from the incoming Administration. The fact that the company are building one or more boats in foreign ports will, it is said, prejudice their case.

The latest war-ship launched for the Italian navy is in size larger than the Duilio, hitherto the most formidable in the fleet, being 387 feet in length, over 13,000 tons register and 19,500 horsepower. She is expected to attain a maximum speed of 19 knots.

The total cost of the postal service of the United States during the last fiscal year was a little more than \$58,000,000, or about \$5,500,000 in excess of the receipts. This deficiency is owing mainly, it is said, to the great extension of the free-delivery service under a modification of the old law and the increase of railway mail transportation. Statistics are given showing that in the cheapness of postage, the number of post offices, extent of mail routes, miles of service performed, postal revenue and postal expenditure, and number of letters and other pieces of mail matter transmitted in the mails, the United States is now conspicuously ahead of every other nation in the world. The statistics of letters, &c., transmitted during the year, which are the first accurate statistics of the character ever published by the Department, are as follows:

Letters mailed.....	1,769,800,000
Postal cards mailed.....	372,200,000
Newspapers and periodicals mailed.....	1,062,100,000
Pieces of third and fourth-class matter.....	372,900,000
Total.....	3,578,000,000

The number of pieces mailed per capita upon the basis of population shown by the last census is 71.

Land speculation rages in Australia, but is discouraged by banking institutions. Transactions were pending in Melbourne at last advices involving an aggregate of at least \$60,000,000.

Hon. Arthur A. Brigham, of Marlboro, Mass., has accepted the professorship of Agriculture in the Imperial Agricultural College at Sapporo, Japan.

Everything in the Argentine Republic is booming at a rate that dazzles even those who are accustomed to extraordinary buoyancy in business affairs. Buenos Ayres papers speak of a wool clip that will exceed that of last year by at least 50,000 bales, and the wheat farmers are expecting a gigantic crop. Contemplating the situation the *Standard* says: "What with the expectations of an extraordinary clip and crop, and the great improvement in prices in the European consuming markets, it need not be wondered at if people in the Plata are preparing for a golden year in 1889; and, verily, everything promises such development at the present moment that we wonder what magical turn we shall see in River Plata affairs next year. We may witness exchange at 48½d and a steady flow of gold from Europe, and on its heels a steady appreciation of paper and gradual return to specie payments. While we mention the possibility of a return to specie payments on the strength of a good season and a rising exchange market, the great majority of financial authorities in this city are convinced that gold will go to 200 next year, in view of the sweeping

avalanche of paper money that is expected in 1889. In this respect, we may add that 60,000,000 more paper money will be issued next year under the provisions of the free banking law of Dr. Pacheco." At present paper money in the Argentine Republic is steadily depreciating, and at the same time the credit of the country is suffering in Belgium and Paris to such an extent that further loans are negotiated with extreme difficulty, or fail altogether.

The Nicaragua Canal Company have been incorporated by a special act of the Vermont Legislature. The representatives of the company stated to a committee that all the necessary concessions had been granted by the Costa Rica and Nicaraguan Governments, and that the work of building the canal will commence at once. Two expeditions sent out by the United States Government have already surveyed the route, and the cost of construction is estimated at \$65,000,000. Three hundred thousand dollars have already been spent in the preliminary work. The president of the company is Hiram Hitchcock, one of the proprietors of the Fifth Avenue Hotel. Judge Charles P. Daly is one of the incorporators, and H. L. Hotchkiss, the Wall street broker, is treasurer and the active man in the enterprise.

Iron shipbuilders are receiving more encouragement, although their yards are already well occupied. The United States and Brazil Line are preparing plans and specifications for building two fine steamships at once, and the Mallory Line have contracted for a new steamship, a four-decker over 300 feet long, for the Gulf and coastwise service.

The Adams Express Company promptly reimbursed the United States Treasury for the amount of \$1400 in silver coin abstracted from a shipment of \$12,000,000 while in transit from New Orleans to Washington City.

The big cities of Japan are in the Island of Hondo, which lies south of the Yezo, and which is several hundreds of miles long and at places 200 miles wide. Here are the chief agricultural regions, the manufacturing districts and in short Japan. Tokio itself has 1,000,000 inhabitants and it lies in the center of the empire. Its distances are more magnificent than those of Washington and its size is about that of Philadelphia. Three hundred miles west of Tokio is Osaka, which has about as many inhabitants as Chicago, and a very few miles off from this is Kiota, which was formerly the capital of the empire, and which boasts as many people as Washington, Kansas City or Cleveland. Osaka is now the New York of Japan and Kiota, with its temples, may be called the Mecca of the empire. Nagoya and Kanazawa are cities each having over 100,000 population, and there are a dozen other cities in Japan, each of which contains from 40,000 to 80,000 people.

The Wells College Building, at Aurora, N. Y., recently destroyed by fire, will be rebuilt at a cost of \$100,000. The building will surround a court containing a fountain and a tower, which latter consolidates the plumbing of the entire structure.

James R. Hosmer, United States Consul-General to Guatemala, reports that Guatemala is enjoying greater commercial prosperity than for ten years past. The coffee crop this year will amount to 500,000 quintals, or 50,000,000 pounds. He recommends a treaty with Guatemala like that with the Hawaiian Islands regarding the duty on sugar.

Haytian commerce is temporarily destroyed by the revolution now in progress. All the ports are completely blockaded, so that merchants in New York can neither receive nor fill an orders until the blockade

is raised. The ports referred to are Cape Haytien, Port de Paix, Gonaives and Saint Marc. A letter received in this city from Port au Prince, where the wildest confusion prevails, says: "Both parties are partial to assassination. General Télémaque was basely assassinated. Were it not for this he certainly would have been elected, and there is no doubt but that he would have served the people faithfully. Port au Prince, Petit Gôave, Léogane, Jeremie, Aux Cayes and Miragoane alone are in favor of General Légitime, the rest of the country having declared for General Hippolyte." At least two American vessels have been seized, and such as are permitted to sail are compelled to leave without cargoes.

Perry Belmont has been appointed Minister to Spain to succeed Jabez Curry. Mr. Belmont, as chairman of the Committee on Foreign Relations in the House, has had much experience.

The well-known suit of J. H. Chandler vs. the Calumet and Hecla Mining Company was decided in the United States Court on 15th inst. against the plaintiff, Judge Severense holding that the mining company's title is good.

The Dominion Cabinet is stirring itself in furtherance of the proposed Pacific cable from New Zealand to British Columbia.

A royal car for the King of Portugal, to be reconstructed on arrival at destination, has been built at the car works in Springfield, Mass.

The annual report of the United States naval constructor shows that \$885,349 was expended during the last fiscal year in the purchase of tools, repair of ships, &c. Tools are now being delivered to the New York and Norfolk yards, and the chief constructor says that we will soon be in possession of two yards well equipped for building steel and iron vessels of war of every size and type. The payments made on account of vessels building under contract up to October 31 last aggregate \$3,266,195. Five vessels were condemned and sold during the year. The present strength of the navy and condition of the vessels is stated as follows: Five double-turreted monitors, awaiting completion; two belted cruisers, preparing ways; 13 single-turreted monitors, in ordinary; 23 unarmored steel and iron vessels, four of which are in commission, 11 building, two repairing, five on station and one in ordinary; 28 wooden steam vessels, nearly all on station or undergoing repairs, and 11 iron and wood steam tugboats. The report of Chief Wilson shows that the expenses of the navy for the past year were \$46,662,000. The estimated expenses for the next year are \$46,364,525, of which \$3,540,000 is for new cruisers.

The greatest railroad enterprise now in progress or in contemplation is the Mexican Pacific Railroad, from San Diego, Cal., along the coast to Mazatlan, and thence to the City of Mexico. The line will be 1900 miles in length, and, when completed, it will begin a new era of development for the great region it is designed to traverse. To San Diego it will be of especial importance, enabling that city to draw upon the rich mines of semi-anthracite coal in Sonora, and upon other natural wealth in the interior of Mexico. From San Diego to Mazatlan the road will run along the coast through a well-peopled country, abounding in ebony, mahogany and other valuable woods. The first part of the railroad to be completed is from Mazatlan to Guadalajara, a distance of 375 miles, and thence direct to the City of Mexico, a further distance of 280 miles. Guadalajara has now more than 100,000 inhabitants, and Mazatlan 25,000.

MANUFACTURING.

Iron and Steel.

Claire Furnace, owned and operated by the Claire Furnace Company, Limited, at Sharpsville, Pa., is at present turning out more iron than ever before in its history. For the week ending November 11th, its output was 1006 tons Bessemer iron, an average of nearly 144 tons per day, or 6 tons per hour. This is certainly a good record for a furnace which measures 15 feet at the bosh and 75 feet in height. The consumption of fuel was 2075 pounds of coke for a gross ton of iron made. Number of hands average about 89 per day. Its maximum output was 310 tons in 48 hours.

No. 2 blast furnace of the E. & G. Brooke Iron Company, Limited, at Birdsboro, Pa., which has been idle since January last, was put in blast on the morning of the 14th inst.

P. L. Kimberly & Co., proprietors of the Atlantic Iron Works, at Sharon, Pa., have recently voluntarily advanced the wages of their laborers 10 cents per day, while the fillers at the blast furnace received an advance of 15 cents per day.

Mount Laurel Furnace, of the Clymer Iron Company, at Temple, Berks County, Pa., which has been idle for some months, was blown in on Friday, the 16th inst.

All departments of the plant of the Belmont Nail Company, at Wheeling, W. Va., are in successful operation with the exception of the tack factory, which is idle for an indefinite period.

During the month of October, just closed, the plant of the Wheeling Steel Works, at Wheeling, W. Va., produced 6834 gross tons of Bessemer steel.

A number of the mills in Pittsburgh suffered no little inconvenience last week by a shortage in the supply of natural gas. The shortage was only at the mills supplied by the Philadelphia Company, and was caused by the delay in laying the 36-inch connection with the Grapeville field, where the company have 12 new wells anchored, ready to be turned on as soon as the necessary connections can be made, which will probably be during the present week. The American Iron Works of Jones & Laughlins, Limited, were partially closed down for a few days owing to the insufficient supply of gas, but have since resumed operations in all departments.

The rumor that Mr. John Walker, who recently resigned the chairmanship of Carnegie, Phipps & Co., Limited, at Pittsburgh, would purchase and put in operation the Clinton Rolling Mill of Graff, Bennett & Co., in that city, is pronounced by that gentleman to be without foundation.

M. V. Smith, metallurgical engineer, of Pittsburgh, is placing a number of Smith gas-producers in the works of the Hartman Steel Company, Limited, at Beaver Falls, Pa. As soon as the producers are completed the firm will manufacture fuel gas and will give up the use of natural gas entirely.

A press dispatch from Youngstown, Ohio, under date of the 15th inst., says: "Sheriff Walker to-day levied on the entire plant of Brown, Bonnell & Co., to satisfy 54 executions in favor of as many creditors. The executions were issued five years ago, but no levy was ever made, an arrangement being made with the creditors to allow the concern to run in the hands of a receiver. It is not the present intention to force a sale of the property. The levy was made simply to prevent the executions from becoming dormant. The

total amount of the executions is \$800,000, distributed among many individuals, firms and banks and other corporations. The levy will not interfere in the least with the operation of the big mills, the proceeding being merely a formal matter.

The new blast furnace of the Moorhead-McCleane Company, of Pittsburgh, was put in blast on Friday, the 16th inst. This furnace was erected to take the place of their old furnace, and will turn out about 260 tons of pig iron per day.

All departments of the steel plant of the Bethlehem Iron Company, of Bethlehem, Pa., which have been idle for several weeks, resumed operations on Wednesday, the 14th inst.

The adjourned auction sale of the Fort Pitt Boiler Works, of D. W. C. Carrol & Co., Limited, of Pittsburgh, was held in that city on Tuesday, the 13th inst. The property is situated at the corner of Short street, Liberty and Third avenue, and is covered by a mortgage, which, with taxes and interest in arrears, will amount to \$37,000. It was bought for Carnegie, Phipps & Co. for \$21,000. By the terms of the sale the purchasers assumed the debt of \$37,000 against the property, which, with the \$21,000, brings the price up to \$58,000. The property, two years ago, was appraised at \$150,000. A member of the firm that purchased the plant stated that it had been bought to satisfy a claim they had against it, but that the firm had no idea of operating the works.

Zug & Co., Limited, proprietors of the Sable Iron and Nail Works, at Pittsburgh, will shortly commence the erection of 12 new puddling furnaces at their plant.

The 32-inch beam mill of Carnegie, Phipps & Co., Limited, at Homestead, Pa., has been placed on single turn and will remain in that condition until enough orders are received to place in on double-turn. The large slabbing mill is at present employed to its utmost capacity.

The Prospect Rolling Mill Company, of Cleveland, were organized August 1, L. Levi being treasurer; A. A. Fuller, secretary and manager; W. F. Loyd, superintendent. They will make merchant bar iron, and are putting in six puddling furnaces. These will run double turn, November 20, and will make 40 tons finished iron per day.

It is rumored that negotiations have been concluded for the erection of a furnace at Leeds, Ala., with 120 tons daily capacity. Henry Ellen coke is to be used as fuel. H. F. DeBardeleben, B. F. Roden and J. F. Johnson are said to be at the head of the enterprise.

Furnace No. 2 of the Lehigh Iron Company, at Aineyville, Pa., is being prepared for blast, and will be blown in shortly. No. 1 furnace, of this company, resumed operations a short time since.

The Reading Iron Works' steam forge on North Eighth street is a busy establishment just now. A 3-ton hammer, which has not been in operation for about a year, will be started up next week. This will give employment to eight men who are now on the night turn. Four hammers will then be in full operation, with every indication that they will be kept going for months to come.—*Reading (Pa.) Times.*

The Bethlehem Iron Company, of Bethlehem, Pa., have called a meeting of the stockholders to be held on the 28th inst., for the purpose of voting on the question of accepting the provisions of the Constitution of Pennsylvania, of 1874, and also of accepting the provisions of the Act of Assembly, entitled, "An Act to Pro-

vide for the Incorporation and Regulation of Certain Corporations." The main object of the proposed acceptance of the constitution and corporation act, at this time, is to enable the company to increase their capital stock under the provisions of said act.

No. 6 furnace of the Crane Iron Company, at Catasauqua, Pa., was put in blast on Wednesday, the 14th inst., after an idleness of several months, during which time it has undergone thorough repairs. All the furnaces of the above company, five in number, are in successful operation.

Mr. B. G. Clarke, president of the Thomas Iron Company, in the Lehigh Valley, states that the improvements in fuel consumption and by the use of richer ores have brought about a saving in the cost of \$1.70 per ton.

Machinery.

L. S. Allison, proprietor of the Hazleton Iron Works, at Hazleton, Pa., has recently purchased and put in operation the plant of the Minersville Iron Works, at Minersville, Pa. The plant is composed of a machine shop 155 feet long and 70 feet wide, a foundry 70 x 80 feet, containing two cupolas, a forge 150 x 50 feet, and a boiler shop 70 x 35 feet. The works will be run on furnace machinery, castings, rolling mill machinery, mine locomotives, mine pumps, hoisting engines and steam shovels, and all kinds of mine machinery and castings with structural work and forgings. Employment will be given to about 150 men.

William Tod & Co., engine builders, of Youngstown, Ohio, have among new orders the ironwork for the new blast furnace of the Brier Hill Iron and Coal Company at that place, and also have an order for a 200-horse-power Porter-Hamilton engine for R. Glover & Sons, of Vincennes, Ind.

The Kansas City Radiator and Iron Foundry Company have their office in the Bayard building, Kansas City, Mo., and their works are located at Argentine, Kan. Their foundry, machine shop and store-rooms cover about 2 acres. The buildings are frame, covered with corrugated iron, and the works are well equipped with the most improved machinery, much of it designed specially for making the Askins patent radiator. The company publish some very satisfactory tests of the efficiency of this radiator, resulting from recent trials in competition with radiators made by other parties. The corporation was formed November 6, 1887, to operate the plant, which was removed about the same time from Lima, Ohio. It was put in operation in its new location last May. The working force now consists of 85 men, who are engaged daily until 10 o'clock p. m., to keep up with orders received. The general character of their business is shown by the points to which the company have recently shipped radiators. These embrace Philadelphia, to which regular shipments have been made for some time; Seattle, Wash. Ter., to which a carload was sent last week; Ogden, Utah Ter., which also took a carload, &c. The foundry now melts about 5 tons of iron daily. Robert P. McGeehan is president and Joseph Askins manager. The company have a capital of \$200,000.

The Anson G. Wood Mower and Reaper Works, which moved to Chattanooga, Tenn., from Youngstown, Ohio, turned on steam November 1 for the first time. Their buildings, covering 2½ acres, are completed, and the machinery all in. They will employ 150 hands.

In answer to a report that Russell & Co., builders of agricultural machinery, at Massillon, Ohio, had recently made a general reduction in wages, we received the

following advices from the firm under date of the 13th inst.:

There is no truth in this statement. We have not made a cut in the wages of men in any department of our works, and have no intention of so doing. It has been our custom toward the close of every year for the past eight or ten years to readjust prices paid piece workmen. During the past few years we have brought out quite a number of new designs and sizes of engines, both in the stationary and portable line. In our engine department we aim to have our men work on piece work as much as possible. We are unable to put our new work during the first of the year on piece-work basis, as we find it necessary to work for some considerable length of time on this class of work by day before we are enabled to establish a rate. We then establish a rate which we consider fair, but in many cases find we are paying too much or too little, and in order to equalize these matters make it a rule to go through all our piece work (especially in our engine department) toward the close of each year and readjust prices. In many instances we have raised the prices that were paid to the same extent that we have reduced in other cases. We can only add, in conclusion, that none of our men have made any complaint, nor do I believe one could be found that is disposed to make any complaint of the adjustment we have made as to the price to be paid on this class of work.

The Kansas City Car and Wheel Company are operating their new works at Birmingham, Mo., 10 miles from Kansas City, in which they have their main office, located in the Beals Building. Their grounds comprise a tract of 36 acres. Their foundry is quite extensive, being 600 feet long by 100 feet wide, with a melting capacity of 200 tons per day. They employ about 500 men and at present have about 1000 cars under contract, which they are building at the rate of 15 a day. A heavy demand is anticipated next season. C. E. Barrett, formerly of Chicago, is now general manager, having taken charge on the 1st of September. The company is a branch of the Missouri Car and Foundry Company, of St. Louis.

The Kilby Mfg. Company, of Cleveland, Ohio, have the contract for the machinery of the Cable Railway Company, of Los Angeles, Cal. Three of the wheels have the following dimensions: One is 26 feet in diameter, with 56-inch face, one 20 feet in diameter, with 50-inch face, its weight being 60,000 pounds, and one 24 feet in diameter, 60-inch face, weighing 80,000 pounds. The Kilby Mfg. Company are crowded with engine orders, are working day and night force, employing 400 men.

The Diamond Machine Company, of Providence, R. I., received at the Cincinnati Centennial Exposition a silver and bronze medal, both the highest awards for different classes of grinding machines. They inform us that they also received the highest premium on their Galloway die stock.

The City Machine Company, Providence, R. I., have discontinued business permanently and are now offering their plant and machinery for sale.

W. C. Jones, late superintendent of the Universal Radial Drill Company, of Cincinnati, and W. S. Rogers, formerly consulting engineer for the same firm, have associated themselves in business in that city as mechanical engineers, with Jno. G. D. Mack, of Terra Haute, as junior member of the firm. They will make a specialty of designing and building special machinery and machine tools, and assisting inventors in patent office work. Messrs. Jones & Rogers were the original inventors and constructors of the universal thread-chasing device and gearing that attracted such attention at the late exposition in Cincinnati. They will eventually have their own shops.

The foundry and machine department of the Harrisburg Car Mfg. Company, of Harrisburg, Pa., report a large number of sales within the last six weeks. Among

these the Ide engine takes a prominent place, the sizes which were sold ranging from 30 to 150 horse-power. Gas plants, Weitmyer furnace settings and ordinary tubular boilers also are well represented in the list of sales.

The Davenport Foundry and Machine Company, of Davenport, Iowa, are quite busy getting out ten fly-wheels, 14 feet diameter, weighing each about 18,000 pounds; ten large disk cranks and couplings, &c., for the Davenport Water Company; also a large lot of castings for the Hawkeye Electric Mfg. Company, who are locating at that place. They will have their works in operation December 1.

The new works of the St. Joseph Pump Company, St. Joseph, Mo., consists of a factory building 50 x 120 feet, three stories high, with a two-story addition, 75 x 50 feet; warehouse, three stories, 50 x 100 feet, dryhouse, varnishing and galvanizing buildings, engine-house and other structures.

Messrs. Warren Webster & Co., 491 North Third street, Philadelphia, Pa., report a large number of orders for their Vacuum feed-water heater and purifier.

The St. Joseph Pump Company, of St. Joseph, Mo., now occupy a new brick building, 50 x 120 feet, consisting of three stories and a basement, which they erected this year. The first floor is devoted to office purposes and the wood-working and iron-working machinery and the shipping department. The second and third floors are used for painting, finishing and storage. The first floor is heated by overhead steam-pipes, and the second and third floors are supplied with steam radiators. The machinery is operated by a 60 horse-power cut-off Ide engine. An elevator runs from the basement to the top floor. The company have a galvanizing department in a separate building, 25 x 60 feet, built of frame. In this department they not only do their own galvanizing, but take work for outside parties. They claim to have the largest dipping kettle west of Chicago, and galvanize plain black sheets, coal hods, light castings, &c. They employ about 35 men. Most of their pump-work is done by special machinery, designed and adapted to meet their requirements. Their special product is the Perfection water elevator and purifying pump. This is a modification of the chain pump, the water being hoisted by small buckets attached to an endless belt made of flat steel links. It is very simple in construction and can be put up in a very minutes, having no wooden or iron tubing to connect and no valves or cylinder plungers. The buckets are made by double seam flanging and require no soldering, their form of construction making them more rigid and less liable to split open than if made in the usual way. The cup is also fastened to the wire link by the double flange, so that the link cannot spring open. The complete chain and bucket are galvanized after construction. Three sizes of elevators are made, with cups of different sizes to correspond. The smallest, for family use, draws a $\frac{1}{4}$ -pint stream, while the largest is of 125 per cent. greater capacity.

Hardware.

F. H. Foster Mfg. Company, Florence, Ala., are making preparations to manufacture an extensive line of builders' hardware. Their factory which is now being constructed will consist of nine buildings, 40 x 100, 32 x 30, 40 x 100, 30 x 50, 50 x 150 and 40 x 60 feet, and three small buildings. It is estimated that they will employ from 200 to 300 hands.

The Newcastle Wire Nail Company, of Newcastle, Pa., are building a large ware-

house adjacent to their works in which to store nails.

A license to incorporate under the laws of Illinois has been granted to the Leroy Crucible Steel Horse and Mule Shoe Company, East St. Louis. The authorized capital is \$200,000. The incorporators are J. Leroy, Selma Watson, William Willis and W. C. Morgan.

The W. S. Tyler Wire Company, of Cleveland, Ohio, have completed their new storage warehouse 52 x 102, four stories. This company are making a specialty of galvanized poultry netting.

W. G. Avery, manager of the W. G. Avery Mfg. Company, Cleveland, Ohio, and patentee of the Avery Seamless Elevator Bucket, has just had another patent granted him for an elevator bucket which will cost less to manufacture while being, it is claimed, equally good.

Miscellaneous.

The new works of the Minnesota Car Company, at Duluth, Minn., are being pushed to completion as fast as possible. Construction will not be suspended during the winter, and the works will be ready for operation by spring. The company propose to begin the delivery of completed cars by July next. The first building east of Central avenue is the paint shop, 56 x 360 feet. To the east of the paint shop is the main erecting car shop, 93 x 526 feet. Fifty-six feet further east is the foundry, 60 x 300 feet. This building will be of solid stone and brick. On its south end will be a wheel pit, 50 x 60 feet, and on the north end the pattern-room, 30 x 60 feet. On the west side will be the boiler-room, 26 x 35 feet. South is a lean-to, which forms part of the foundry building, 18 x 100 feet. Connected with this lean-to is the brass foundry, 18 x 20 feet. On the east side of the foundry, both at the north and south ends, are core-rooms, each 18 x 20 feet. East of the foundry is the rolling mill, 80 x 161 feet. North of the rolling mill will be the forge building, 70 x 100 feet, and 20 feet away will be the gas producers and boilers, in a building 40 x 100 feet. Through the property tracks connect with the St. Paul and Duluth Railroad.

Perkins & Son, of St. Joseph, Mo., recently closed out their hardware and stove business and purchased the St. Joseph Novelty Works, combining with it their business in the manufacture of Perkins' patent corrugated iron fire-proof shutter. They have added a foundry to make light castings, and will soon begin the manufacture of iron fencing, fire-escapes, cresting and other specialties. They will carry in stock corrugated iron roofing, conductor pipe, &c.

The Topeka Wind Mill Mfg. Company, of Topeka, Kan., make the Topeka automatic self-regulating solid and sectional windmills. They began work March 1st of the present year and have already put out over 200 of their mills, for which they control the territory west of the Mississippi river. The machinery of their plant is operated by a 20 horse-power automatic cut-off engine, and the total capacity of their works is 200 windmills per month. All sizes are manufactured, from 300-barrel tanks down to 5 gallons, and they are either for tops of buildings or towers.

The Cambria Iron Company, of Johnstown, Pa., have purchased the plant of the Dunbar Coke Company, in Fayette County. The property consists of 50 acres of Connelville coking coal under water level, with 10 acres of surface, on which are erected 80 ovens, having a capacity of 50,000 tons a year. There are also dwelling houses for employees on the premises, and engine and boiler house, office, blacksmith shop, tipple and water bank in good order.

The Iron Age

New York, Thursday, November 22, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
 CHAS. KIRCHHOFF, JR., - EDITOR.
 GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
 RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
 JOHN S. KING, - - - BUSINESS MANAGER.

The Denver Castings Contract.

We print elsewhere a letter relating to Denver cable road contract, written by John H. Piper, addressed to the editor of the *Evening Post*, and the reply which flowed from that fountain head of wisdom. It will be noted that the real issue is dodged. As we stated when first we referred to the matter, it is evident, by even a superficial computation, that at a rate of duty of $1\frac{1}{2}$ cents per pound the contract cannot be filled at the delivery price named from England. We may note incidentally that even this superficial computation, when carried out by the *Evening Post*, was marred by the unfortunate mistake of assuming the ton in this case to be the long ton of 2240 pounds. The price was distinctly named as referring to a ton of 2000 pounds. The $1\frac{1}{2}$ -cent rate of duty would therefore be \$25 a ton, not \$28 per ton, as our afternoon contemporary has it.

Now, let us do a little superficial figuring on our own account, but on the basis of a 45 per cent. ad valorem rate, which the *Evening Post* does not even deign to consider. Assuming that the English price delivered at Denver was, after deducting commissions, &c., \$37.50; deduct \$7 for freight from Liverpool to Denver and 50 cents from foundry to Liverpool, and we reach \$30 at foundry as the price plus 45 per cent. duty. The price would therefore be \$20.69 at works, the duty being \$9.31 instead of \$25 at the specific rate.

Based on a \$16 cost of stock and shading \$30 on the castings, the difference to represent cost of fuel, labor, sand, &c., would be, say, \$14 full for Chicago. In England the cost of stock would certainly not be more than \$9 per ton—not \$10, as the *Post* has it—since a lower grade than Scotch pig would be used, leaving \$11.69 to cover the same costs. We would then have only a difference of less than \$2.31 to compensate for lower English fuel and labor and cheaper capital. The *Evening Post* makes the ridiculous mistake of assuming blast furnace and foundry labor to be of the same class. American molders would quickly resent any attempt to pay them only double the wages which the average furnaceman receives. Coke in Chicago costs more than double the English price.

We repeat that we do not profess to give the exact figures in this computation. We merely want to show, giving the other sideliberal allowances, that it may happen, when there are added to the actual advantages of lower labor, fuel and stock, a lower freight rate, that a duty of 45 per cent. ad valorem is inadequate.

Our mystified contemporary befogs its readers when it stumbles blindly into other subjects, like the sales abroad by Americans of locomotives, and their taking contracts for bridges, &c. So far as the latter are concerned we may state that

the bulk of the material is foreign stock shipped direct from foreign workshops to the country in which it is to be used. Our locomotives are better liked in new countries where the conditions of road-bed, &c., are very much like our own. Railroad managers in South America and Australia are willing to pay us more, especially since English makers have not yet overcome their prejudice sufficiently to copy our designs or our methods of manufacture.

There was no necessity to go so far afield. We leave our contemporary to puzzle itself and its readers over the fact that English founders can beat American on the price of yoke castings in Denver, while we can sell stoves under their noses in some common markets.

The Knights of Labor.

The pretentious attempt to unite all wage-workers in this country under one grand organization has proved a dismal failure. It would be idle to deny that a great many fair-minded men regarded with lively satisfaction the early career of the Knights of Labor. Their hope that the disastrous conflicts, under which all suffer alike, would become less frequent and less injurious was soon destroyed, however. The professions of the recognized leaders of the order and the acts of the more turbulent members, who soon developed as the real rulers, could not be reconciled. Every accession to power seemed to feed the mania for striking. Every week brought fresh reports of wanton disregard of common sense and justice. Rushing blindly into one ill-advised battle after another, success increased the irritation, and defeat failed to gain the sympathy of the public. Relatively few in numbers, victories only led to courting of failure by emboldening to later more reckless attacks. Rival factions struggling for supremacy weakened the power of the best element for good. The rank and file were as loyal as workmen always are to their organizations, but the officers soon proved deficient in generalship. They were routed in every pitched battle, and the great army, swelled to hundreds of thousands, melted away almost as quickly as it gathered.

At Richmond two years ago the order had an aggregate membership of 800,000, and claimed to be 1,000,000 strong, whereas now, as reported by Secretary Hayes, there are not more than about 280,000 members in good standing, and receipts have fallen off in a still larger ratio, and fail to meet the necessary expenditures.

Mr. Powderly, however, is not alarmed, and suggests a reorganization on a more substantial basis, with an Executive Board reduced to four members—the General Master Workman to have full power. The annual address of Mr. Powderly, whose influence in the order seems to have been little impaired by the intrigues of ambitious rivals, refers to the lack of harmony in the Executive Board, “the unwise strikes which were entered upon against the laws and principles of the Knights of Labor,” and which swept thousands into poverty. Mr. Powderly says: “I do not blame men for striking. I blame them for making fools of themselves in not knowing how to strike. They always strike at the top leaf on the tree,

because it appears plainest to the vision; but they always leave the root undisturbed, to grow other and more powerful shoots. On many an occasion I have almost lost patience with prominent men in the labor movement, men who have lived in the past so long that they cannot see that the agencies of this generation are entirely different from those of any other, and from their point of view the strike has the same power as of old. We must teach men what it is that creates a necessity for a strike. They must be taught how to strike effectively against the system which permits gambling in money, in land, in railways and in the very food which is withheld from the mouths of millions at the sound of the stockbroker's ticker.”

Mr. Powderly proceeds to define the future scope and limitations of the order. Trade matters, he says, should be left to the national trade assemblies, and attention be directed to the more important questions of “finance, land and transportation.” In conclusion, he directs his lance with special vim against “the designing knaves” who have “secretly and untiringly worked for the ruin of this order.” He makes no allusion, however, to the rise of the American Federation of Labor, now boasting of a membership approximating 700,000, and which thus far seems to have studiously avoided the rocks upon which the Knights have so furiously dashed themselves—namely, strikes, dissension and extravagance. Altogether the outlook for the Knights of Labor is rather gloomy. Their purposes are too indefinite, if not chimerical, and within the order itself there is too much that is intractable, explosive and irreconcilable. If we mistake not, the period of the decadence of the Knights dates from the time of the attempted enforcement of the boycott and the inevitable conflict that ensued in the courts of justice. Affiliation with the enemies of law and order or any course tending in that direction must in the end bring self-destruction. A radical departure in this respect may bring a more hopeful future.

It has been a favorite argument of those who have undertaken to dictate the price of copper for many years to come that a value of some 15 to 17 cents a pound represented far more closely the range at which the mines of the world could supply its requirements at a fair profit than 11 to 13 cents. We know that so far as this country is concerned, the claim is not true. We know that the three leading Lake mines, the Calumet and Hecla, Tamarack and Quincy, alone could supply between 75,000,000 and 80,000,000 pounds annually at a good profit at 11 cents, and that Arizona can furnish 15,000,000 pounds at $10\frac{1}{2}$ cents, and make fair money on investment. But we have thus far few, if any, data to guide in an estimation of the capacity of the Butte mines. We know that the Parrott made a little money even in the dullest times, but of the others no indication of their financial results have come to the surface except lately. The Boston and Montana Company are now, by an official statement, shown to be able to place copper on the market at a little less than $8\frac{1}{2}$ cents. The Anaconda and the Parrott may have lower or slightly higher costs, but it is evident that 10 cents would not be ruinous to any of them. At that

price the three could certainly produce 100,000,000 pounds per annum. They are doing more now. Here we have nine concerns, three in each of the leading districts, which could supply close upon 200,000,000 pounds of refined copper per annum at the range for the different qualities of 10 to 11 cents, and make a fair profit. Such a product would be far in excess of our consumptive requirements even on the basis of the heaviest business we ever have had. Not the most sanguine in the copper trade has placed our consumption above 150,000,000 pounds. It borders on the ridiculous to point back to the prices of past decades. They have nothing to do with values as determined with natural conditions as they exist now. The question is how much of the metal can be put on the market at a given price, plus a fair profit. We hold that 11 to 12 cents for lake copper is a fair figure, considering cost, supply and demand. Every cent wrung from consumers above that is the tribute paid to the French speculators and their allies, the American copper companies. There may be some consolation in the fact that the latter have by far the better end of the bargain, that European consumers are probably contributing to their dividends on the quantities exported larger amounts than the profits which the syndicate is reaping from American consumers. Boston investors have had losses enough in other directions to entitle them to some relief.

Late Developments in Cuba.

Cuba has again had to contend with a good many difficulties this year. Politically, the island has been quiet, but brigandage and incendiarism became so frequent and widespread, coupled with the occasional kidnapping of wealthy merchants and planters, that in April Captain-General Sabas Marin issued a decree declaring martial law in five provinces. This measure to suppress crime has proved most beneficial. Bands of robbers have been broken up completely and fugitive members captured daily. On September 4 and 5 a destructive cyclone swept the island through its entire length, from Point Maisí to Cape San Antonio, its greatest violence being exercised in the province of Santa Clara. The damage done to property was counted by millions, and 1000 people lost their lives. It was at first apprehended that the growing sugar crop had suffered to the extent of 25 per cent.; fortunately, these fears were disproved afterward. Abundant rains followed, and the canes have been in fine condition ever since; so much so that there is promise at present of even a larger yield than the one of 1888, good as it was. Mining for gold and for iron ore has been active; titles were granted for the working of two quick-silver and one antimony mine; and, by royal order, the island has been divided into an Eastern and Western mineral district, each district to be placed in charge of a special mine inspector. The strike of cigar-makers has been repeated this year, and for over a month brought this important industry to a standstill. Early in October work was resumed. The completion of the Cuban railroads has been going on steadily; the Caibarien and Sancti Spiritus railway is to be extended to Santa Clara,

with a new branch line from Placetas to Hernandez. Seldom has the laying of private portable railways on sugar estates been so extensive as this year. The Government has also regulated telephone enterprise in Cuba, Porto Rico and the Philippine Archipelago. The State is to receive 6 per cent. of the gross receipts, the concessions are to last 20 years, at the end of which period everything passes to the State. The finances are also getting into better shape. The first thing Captain-General Sabas Marin did when he came into office last year was to thoroughly purify the Custom House service; since then the revenue from that source has been a great deal more bountiful than before his accession to power. The budget of the island for 1888-89 estimates the income at \$25,622,968, and the outlay at \$25,614,494. In October offers were made to the home Government by Spanish and foreign bankers to convert the indebtedness of Cuba, bonded and floating. The plan is to reduce the 6½ per cent. interest and sinking fund of the \$124,000,000 1886 loan to 4½ per cent; and give the new bonds 75 years to run instead of 50.

Since the rise in sugar took place in the world's markets, last spring and summer, the Cuban planting interest has become more prosperous, centrifugals bringing, this summer on an average 5½ reals in the Cuban markets, instead of 4½ reals, as during the corresponding period of last year. The crops have yielded in sugar, and molasses reduced to sugar, the following amounts:

	Tons.		Tons.
1879	816,566	1884	674,539
1880	644,432	1885	778,951
1881	590,511	1886	918,787
1882	727,061	1887	799,503
1883	560,689	1888	777,504
Totals	3,339,259		3,949,464

This is an increase of 610,205 tons, or about 20 per cent.

Field hands are scarce and receive \$20 per month and found. It is reported from Ottawa, Ontario, that Sir Charles Tupper is actively engaged in negotiating a treaty of commerce between the Dominion of Canada and Spain, and that Sir Charles proposes to secure for Canadian products the advantages in Cuba and Porto Rico that were granted to the United States by the treaty rejected in 1885. Among the articles to be admitted duty free into the United States were horses, cocoa, coffee, fresh fruits, hemp, flax, hides, palm oil, sugar not above No. 16, Dutch standard, molasses, woods, sponges, guano and coin. On cigars and cigarettes the duty was to be 12½ per cent. ad valorem; fine tobacco, with stems, 37 cents per pound; without stems, 50 cents per pound; other tobacco, 17½ cents; snuff, 25 cents; manufactured tobacco, 20 cents, and not manufactured, 15 cents. Among the American articles to be admitted duty free into the Spanish colonies were beer, fresh meats, bacon, fish, grain and other cereals, except rice, flour of cereals except rice, lard, cheese, cattle, sheep and hogs, clay, tiles, bricks, minerals, useful tools, agricultural implements, crude petroleum, tar, pitch, rosin, coal, seeds, building stones, ice, cast-iron in pigs and tubes, malleable iron and steel, wire, nails, screws, wrought-iron tubes, substances used in chemical industries and drugs. The Canadian Government is stated to have been engaged for a year or

two in trying to secure the West India trade, but with seemingly little success.

None of the treaties negotiated on a similar basis by Mr. Frelinghuysen, during the administration of President Arthur, has become operative, President Cleveland's administration evidently not feeling disposed to push our commercial policy in that direction. What the views of the incoming administration on this subject of the treaties with Mexico, Spain and Santo Domingo may be is as yet doubtful. There is an impression, however, that an effort will be made to revive them all. American trade with Cuba has been as follows:

Fiscal year.	Import.	Domestic export to Cuba.
1888	\$49,319,087	\$9,724,124
1887	49,515,434	10,138,930

More than ever we are absorbing nearly the entire Cuban sugar and molasses crops, hence the fiscal policy of the United States to be adopted in the future, especially as bearing on those articles, is vital for Cuban planters and merchants.

Strong pleas are made every now and then in favor of the vertical boiler in some of its various forms, and it has by some been warmly advocated even as a substitute for all other types of stationary steam generators. The first cost of the boiler, it is generally claimed, is moderate, it requires no setting, is easily repaired, compact, and, on the whole, efficient. This is a reasonable string of arguments, well entitled to consideration; but a moment's reflection will show that, after all, these inducements which it offers are not specially remarkable. Some of the boilers already in common use—the well-known return tubular, for example—meet these claims equally well, and besides have none of the drawbacks with which the vertical design can be justly saddled. Superior economy and safety, which have frequently been added to the other claims for the latter, have but a slight, if any, foundation in fact, and should properly be viewed in the light of all the attending circumstances. In the matter of freedom from danger from low water, cheapness as regards setting and small floor space necessary, the vertical boiler finds, no doubt, its strongest supports, the advantages which it affords in these respects being fully admitted and well recognized. It may also be held with some reason that the steam which it furnishes is slightly superheated and consequently dry, the upper ends of the tubes acting as superheating surface. Beyond this, however, generally speaking, the comparison with other types becomes less favorable. In point of evaporative power the vertical boiler is certainly not remarkable—in fact, generally below the average. Comparing the performances of ordinary horizontal brick-set boilers and of uprights, the relative capacities have been found to show a heavy balance in favor of the former. Thus in two given plants a set of vertical boilers with shells 87 per cent. as large as the horizontals had only one-third the capacity. As to freedom from danger in upright boilers, this, as in many other forms, with the exception of the low water danger to which we have already referred, is maintained only by judicious management, and finally, as regards durability and lightness of repairs, experience shows that these items cannot be advanced as

favoring the type. Extending, as they do, above the water line, the upper ends of the flues cannot be counted upon as heating surface, and furthermore frequently leak where they are expanded into the upper tube sheet, the unprotected ends rapidly succumbing to the high heat of the gases of combustion. Those who think, therefore, that they must have an upright boiler for many purposes where a horizontal tubular could be used to much better advantage, will do well to keep some of these points in mind. They bear directly upon what most concerns the steam user—the return of power for a certain expenditure of money.

That Denver City Contract.

To the Editor of the Evening Post:—
SIR: A few days prior to election you quoted from a Western paper an article referring to the fact that an English concern had entered into competition with a large number of American foundries for 5000 tons of castings for a cable railroad in Denver, Col., and that this English concern had underbid its American rivals, and had received the contract. You finally dismissed it with the remark that you believed the story was a campaign falsehood. I admit I was of that opinion myself, but *The Iron Age* (November 1) gives a full statement of this affair, and I think it is probably correct in its statement; at least, as *The Iron Age* puts it, the story seems to bear the evidence of truth. While its version differs considerably from that given by the Western paper, the substance of both is that an English foundry has underbid the lowest American bidder for this work, and is to ship to this country 5000 tons of castings (on which there is a duty of 45 per cent. ad valorem), and deliver them in Denver for less money than our Chicago foundries were able (or willing) to do. I must admit that this is a remarkable instance of what our high-tariff friends call foreign competition.

I wish you would tell your readers, of whom I am one, how this competition is possible, with our 45 per cent. tariff, and what we might expect under a lower tariff. The Mills bill makes 5 per cent. reduction on this class of goods. Yours respectfully,
JOHN H. PIPER.

November 12.

[It is not the Mills bill, but the Senate substitute, that makes a reduction of the duty on iron castings, and herein we think that the Senate bill is preferable to the Mills bill.]

We said that if the Chicago foundrymen could not compete at Denver with English foundrymen, who are handicapped with a duty of 45 per cent. ad valorem, or of \$28 per ton, as the case may be, they were greater slovens than we had taken them for. The basis of the cost of castings is the cost of pig iron, which *The Iron Age* puts at \$16 per ton in Chicago. The cost in Glasgow, Scotland, is 41/8 per ton, equal to \$10. Therefore, the disadvantage of the Chicago foundryman at the outset is \$6 per ton, against which he has the advantage of \$28 per ton duty, a net protection of \$22 per ton. Now, where does all this bonus go to? Not to labor. We have not the figures of comparative wages in English and American foundry work before us, but we have those of blast-furnace work, in a recent consular report (No. 49, Department of State), from which it appears that the labor cost of pig iron in Middlesboro', England, is 79 cents per ton, and in Eastern Pennsylvania \$1.25 per ton; difference, 48 cents per ton. The difference between the two countries in the labor cost of castings cannot be very much greater, but we will suppose that it

is \$1 per ton. Then we have \$6 difference in pig iron and \$1 difference in labor, total \$7, against a duty of \$28. What becomes of the other \$21 of net protection? *The Iron Age* says that the English foundrymen got a freight rate of \$7 per ton from Liverpool to Denver via Galveston, while the railroad charge from Chicago to Denver was \$9 per ton. That is a question which evidently has no relation to the tariff, but if we count it in it subtracts \$2 more from the net protection, leaving \$19 per ton bonus, or considerably more than the total cost of the raw material, pig iron.

There is some mystery about this affair which we do not attempt to penetrate, and the mystery deepens when we read in the trade journals almost every day that American firms have been awarded contracts for iron bridges and for locomotives in Australia, Chili and other foreign countries, where they are obliged to compete with English contractors on equal terms. We should say that if our foundrymen could not compete with English firms in the interior of the United States under the present duty, in the second century of the republic, it was the best possible evidence that protection was a failure as to that particular branch of industry, and that it was high time to try some other system; for is not the buyer of castings also an American citizen and entitled to some consideration? Even the Denver Cable Railway Company have some rights which white men are bound to respect.—*Ed. Evening Post.*

We comment on this reply editorially.—
Editor Iron Age.

The Grindstone Decision.

We print below in full the letter of Hugh O. Thompson, acting Secretary of the Treasury, to the collection of customs, at Suspension Bridge, relating to the duty on grindstones:

SIR: The Department duly received your letter of the 11th ult., transmitting the appeal (9438 s) of J. J. McIntyre from your assessment of duty at the rate of 20 per cent. ad valorem on certain so-called "grindstones" imported, per Michigan Central Railway, August 7, and returned for duty as an unenumerated manufactured article, under section 2513 of the Revised Statutes, and in accordance with the Department's decision of March 17, 1887 (Synopsis 8120). The sample submitted with your letter was forwarded to the collector at Boston, with the request for a report of the practice at this port on importations of such articles, it having been stated in the appeal of the importer that this class of stone is being passed at that port as grindstones, at a duty of \$1.75 per ton, under T. I., 438; and reports from the collector and appraiser at that port have been received, from which it would appear that Department's decision above mentioned was based on a misunderstanding of the character of this class of merchandise.

The appraiser states that these stones are imported at that port in an unfinished condition, and subsequently brought to a finished state, according to the use to which they are to be applied—that is, when the stones are to be used for grinding wood into pulp they are made in sizes varying in thickness from 8 inches to 26 inches, but when they are to be used for grinding metal, smaller sizes are made. This appears from the report of the appraiser to be the only difference between the stones used for grinding wood-pulp and those used for grinding metal, both being mounted or hung upon their axes, and being used in the same manner, there being no difference in the hardness or other characteristics of the stones, the same stone being in fact suitable for grinding either metal or wood.

Regarding the resemblance to burr-stone, referred to in Department's decision, the appraiser states that the Department is undoubtedly misinformed, inasmuch as the burr-stone is a remarkably hard, silicious stone, well known by its cellular structure and process of manufacture for the purposes required of it, and also that all burr-stones have a centripetal action, while the grindstones in use for producing wood-pulp or reducing metals revolve upon their axes, the wood being pressed against the outer surface or face of the stone in the same manner as metal is pressed when being ground.

It therefore appearing that these stones have every characteristic of common grindstones,

and are in fact such grindstones, the decision first above mentioned will be modified accordingly, and these stones admitted to duty at the rate applicable, under T. I., 438, for "grindstones, finished or unfinished." You will accordingly reliquidate the entry at the rate last mentioned, and take the necessary steps for refunding any excess of duty that may have been exacted on this importation. The same course may also be followed as to any prior importations, where duty has been erroneously assessed as in this case, provided the provisions of section 2931, Revised Statutes, as to protest, appeal and suit, have been duly complied with.

Big Steel Record in 1877.

The achievements of the past decade in increasing the output of Bessemer steel works are greater than the majority of those not directly connected with the industry have any idea of. Consulting the files of *The Iron Age* for the year 1877 we found the following record of work in March at the Edgar Thomson Works. As a "milestone of progress" it is interesting. Suffice it to say that the day is not very far off when the works will do three times the amount of work pointed to with pride as a great record in 1877.

The American Bessemer works have become famous the world over for their large product, surpassing in this respect the works of any other country. Before the Centennial brought so many foreign engineers to see for themselves, the reports of the large runs made had been received with incredulity, and if courtesy had permitted it they would have been disbelieved. But "seeing is believing," and we can tell the story of the run at the Edgar Thomson Steel Works, at Pittsburgh, without any fear that it will not be accepted as true. The report is as follows:

Product of the Edgar Thomson Steel Works for the month of March, 1877.

	Tons.	Lbs.
Total product of converting works, gross tons.....	8,002	1,560
Best 12-hours' work.....	204	40
Best 24-hours' work.....	407	1,180
Greatest speed accomplished, 8 heats in 1 hour 50 minutes, making....	52	1,060
Total product of blooming mill....	8,029	1,730
Best 12-hours' work.....	209	2,060
Best 24-hours' work.....	410	1,630
Total product of rail mill on rails..	5,355	469
Best 12 hours, 644 rails.....	172	480
Best 24 hours, 1286 rails.....	344	...
Greatest speed accomplished, 120 rails in 1 hour 52 minutes, making, gross tons.....	32	320
In addition, product of rail mill on billets.....	216	948
Number of blows.....	1,216	
Number of ingots.....	8,302 1/2	
Number of rails rolled.....	21,572	
Percentage of second-class rails.....	0.50	

There are, besides the large total product, two most surprising features in the above report. The first is the small percentage of second-class rails—one-half of 1 per cent.—a most convincing proof that quality was not sacrificed to quantity; the other is the rapidity of rail making. It seems almost incredible, even to one acquainted with the process, that during 12 hours' run the average time occupied in rolling each rail was but a very small fraction over 1 minute 7 seconds; that 120 consecutive rails were rolled in an average of 56 seconds each, and that, notwithstanding this, the second quality rails were only one-half of 1 per cent. The managers of these works can certainly be congratulated on the excellent results indicated in the above report.

The Avery Elevator Bucket Company, Cleveland, Ohio, will occupy their new building in a few days. It is 80 x 264 feet, the engine and boiler house 50 x 55 feet. They will add several new stamping presses. The capacity will be doubled.

Pittsburgh editors remind their readers that \$380,000 are still needed to finish the exposition buildings and open the doors.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., November 20, 1888.

As the Republican Senators come together and confer with each other as to their probable course on tariff legislation, now that the control of public affairs is prospectively in their hands, they show some indecision. It is their present plan to call a caucus early after their meeting, to determine this important question, with others which will require their attention, in order to facilitate the business of the coming session, which will be brief by Constitutional limitation. The prevailing sentiment is to adopt one of two lines of action; the first, to renew the consideration of the bill immediately after the re-assembling of Congress, and taking a vote, so that it may go to the House to be disposed of as they see fit, and the other is to let the bill rest and have the House prepare a new one, based upon the Senate bill, with certain additional articles, like tin plate, placed on an absolutely protective rate. The Senate bill will receive early attention when that body is not overrun with business. A few days will determine to what extent the opposition will antagonize it.

The officers in charge of the steel inspection are now engaged in compiling a tabulated exhibit of the results of their tests and experiments in connection with the material used in the construction of the new ships of the navy. They have accumulated in the past two years' reports of the officers assigned to the different establishments employed under contracts with the Navy Department a vast amount of data in steel manufacture, showing the tensile strength and other physical properties of armor plates and forms. Much of the data used goes further into the details of composition than they feel authorized to communicate on account of the confidential nature of much of the information placed at their disposal by the manufacturers. The results, it is claimed, have been compiled for the private use of the Department, and for the benefit of officers assigned to duty under the Board of Steel Inspection. They are also engaged in collating the record of results which, when completed, may not be treated in the same confidence, as it will deal only with the statement of tests.

It appears that the board has become possessed of much valuable information in the nature of formulas for mixing metals to produce certain properties which they are not at liberty to make general without the consent of the parties furnishing it. The theoretical results of the labor of the board are a great advance upon the knowledge of steel manufacture when these valuable tests and experiments were commenced with the first products of steel under the contracts for the first ships. In a general way the officers say that our American steel producers can now compete in the best works in the world in the character of material they turn out. The studies made within the past two years have been unexpectedly great, and with the even more liberal appropriations which may now be expected for the construction of additional ships and armored seacoast defenses this important work will be carried to even greater perfection.

The movement inaugurated by Secretary Whitney in the reconstruction of the navy, and the intelligent manner in which he has officially forwarded this great work, will be an enduring tribute to his statesmanship and patriotism while at the head of the civil administration of that much-abused Department of the Navy. It is not improbable that the Department may authorize the preparation of a tabu-

lated exhibit of the results of the tests for general information, and possibly this valuable contribution to our knowledge of steel in structural forms may be extended so as to make it of practical use. Secretary Whitney, in speaking of the work accomplished under his administration of naval affairs, said: "I do not think that I would be assuming too much in saying that the navy and its prospects of steady and intelligent expansion are better today than they were four years ago. I believe that the reconstruction of the navy on modern principles is now an established fact, and that from year to year the work will go on until the flag of the United States will wave over the finest navy of any nation in the world. The ships we already have afloat and those which are rapidly nearing completion are the best of their class. It is quite possible within a few years the nations of the world will be studying steel naval architecture from us, instead of our going to foreign countries for models and ideas." The Secretary continued: "I have no doubt but that the new Administration will go on with this work. The present Administration has made a good record in this branch of national advancement. The vessels already finished or under construction will give us a fleet of 20 steel vessels of all kinds. This in itself will make a very creditable showing. Besides all this, the Government will have at its command plants which will be prepared to turn out the largest castings and forgings required for shipbuilding. We also can now manufacture the best steel in the world, so that our ships are being constructed not only on the best-known models, but of the best materials. If nothing else were done to characterize the present control of public affairs, the condition and prospects of the navy would be an evidence of progress."

A Montana Copper Company.—The Boston and Montana Consolidated Copper and Silver Mining Company have issued a statement showing that the product of matte was 14,565,867 pounds, yielding 59.44 per cent., and the product of shipping ore was 354,417 pounds, yielding 44.44 per cent., or a total of 8,815,987 pounds of refined copper, from which has been realized the gross sum of \$1,015,762.55. The costs have been:

Interest.....	\$671.52
Expense account at New York and Boston.....	15,848.08
Copper charges.....	22,513.71
Refining charges.....	19,832.97
Transportation.....	84,709.16
Mining expense, 12 months.....	597,138.88
Total.....	\$740,714.32

This left a mining profit of \$275,048.23, the cost per pound of copper sold being 8.4 cents. The company spent \$153,453.16 for construction at the mine and works, and \$37,500 on mine and smelting plant, leaving a balance of \$84,095.07.

From the Marquette (Mich.) *Mining Journal*, of the 10 inst., we take the following table, showing the shipments by ports up to date this season, in comparison with shipments for the corresponding portion of the two preceding years:

Port.	1888.	1887.	1886.
Marquette.....	779,648	784,953	817,428
Escanaba.....	2,002,458	1,962,766	1,447,053
St. Ignace.....	106,820	88,745	71,020
Ashland, Wis....	981,482	1,021,792	698,488
Two Harbors,			
Minn.....	408,819	380,196	300,954
Total.....	4,279,227	4,238,092	3,384,943

While at Providence, R. I., last week we had occasion to see the new Strong locomotive recently turned out of the shops of the Hinkley Locomotive Company for the Atchison, Topeka and Santa Fé

Railroad. The engine was stationed at the roundhouse of the Boston and Providence road, preliminary to making its first trial run with a freight train on that line between Providence and Stonington. The first trip was made during Friday night, and the engine will be kept at work there for a week or ten days before going West. The locomotive is four-coupled and has 19 x 24-inch cylinders and 5 foot 8 inch drivers, the total weight being 60 tons. Of this 72,000 pounds come on the drivers. Mr. Strong has designed for this engine a new wheel, having spokes of rectangular section. A striking feature about them is the absence of counterweights, so far as appearance is concerned, the counterweighting being accomplished by filling the desired number of spokes, which are hollow, with lead. The engine has been named A. G. Darwin, after the president of the Strong Locomotive Company.

Southern Furnaces and Rail Freights.

Under date of November 19, T. H. Carter, Commissioner of the Southern Railway and Steamship Association, has issued the following circular relating to pig-iron contracts:

The agreement in regard to pig-iron rates and contracts, provides as follows: "Should any of the furnace companies sell iron during any month for future delivery, to which they desire that rates in effect at date of sale shall apply, they shall report such sales to the commissioner, giving date of sale, consignee, destination and duration of contract; stating, approximately, the month in which shipments will be made; provided that the rates of freight shall not be guaranteed on sales made after more than 12 months from date of sale." It was clearly the intention that the furnace companies should report promptly contracts for which they desired protection at rates in effect when sales were made, and I must advise you that, in future, no billing orders will be issued for sales which are not promptly reported (say within three days from dates of sales). Sales should be reported by the furnace companies, or their regularly authorized agents, as I understand delays have sometimes occurred by reason of furnace companies having depended on commission merchants to report sales, while the commission merchants thought the furnace companies had reported. In addition to sales for which contract rates are requested, and which, as above stated, should be reported promptly when sales are made, each of the furnace companies should, in accordance with the agreement, report on the 15th day of each month all iron sold during the preceding 30 days for shipment to points on and beyond the Ohio River, but for which contract rates are not desired, stating to whom sold, destination, quantity sold, and price for which sold; as this information is necessary in making the monthly adjustment of rates. The furnace companies have been very negligent in regard to the reports required on the 15th day of each month, and considerable difficulty has been encountered from time to time on account of a lack of proper information on which to fix the rates in accordance with the agreement. Your co-operation is earnestly requested, and I trust that less difficulties will be encountered in the future.

The export duty on pine logs has been increased 50 per cent. by the Canadian Government, thereby hastening the destruction of American forests.

London *Industries* gives some interesting figures showing the growth of the operations of the London Hydraulic Power Company. In the last week in October, 1887, there were 570 consumers, using a total of 1,942,000 gallons of water. In the last week of October, 1888, the number of consumers was 780, and the consumption of water exceeded 3,000,000 gallons. The company have completed contracts for supplying another 120 consumers, which will bring the number of consumers up to a total of 900. Nearly 30 miles of hydraulic mains are at present laid in London. The power is available day and night and on Sunday all the year round at a pressure of 700 pounds per square inch.

Range and Position Finding in Coast Defense.

The object of "range and position-finding" is to ascertain the distance and location of the enemy's ships. In this way guns can be directed without the target being visible to the gunners. As the smoke very quickly obscures the direct field of view, this arrangement becomes essential to an efficient military defense. It may sound strange mention of the fact that experimental firing made with the assistance of such a system, the gunners in laying their guns not seeing the target, has given better results than when the guns were sighted directly on the target. This has been the case to a conspicuous degree where the target was in motion. The system is necessary for the operation of fixed submarine mines when they are exploded at the will of an operator.

This is how it is done: In all cases the distances are plotted on maps divided into numbered squares. Tables are provided for each gun, giving the horizontal and vertical angles necessary to attain the middle of each square. The traverse circles are divided for the horizontal angles, the meridian line being usually taken as the zero line. The number of the square into which the target is likely to move being telegraphed to the gun, it can be pointed very quickly, and the instant of firing indicated afterward from the observing stations. In this way a very large number of guns can be concentrated from different batteries on a single vessel or group of vessels.

Electrical communication is utilized for range and position finding of various systems. Two general methods are in use—one having two observers at the extremities of a horizontal base line, and another with a single observer placed at some height above the general level. In the two-observer method the angles are measured, and either plotted directly or are transmitted to a central station for plotting. It is essential that this work shall be done very rapidly and accurately. To read the angles and then transmit and plot them involves loss of time and chance of errors in each step of the operation. Efforts have therefore been made to eliminate the necessity of reading the angles and to transmit and plot them automatically. The Siemens apparatus is considered a typical arrangement for this purpose. It consists of two parts used at what may be called the plotting and the auxiliary station.

A plain table, divided into squares, has a map of the harbor thereon. On this table is a telescope with cross lines, carrying an alidade or straight-edge. At a point representing on the map the other observing station is a "step-by-step" electrical mechanism carrying a very light aluminium alidade, which is operated by impulses received from the auxiliary station. At the auxiliary station a box is placed containing a small hand dynamo and a telescope with cross lines. The hand dynamo being worked the telescope is moved to bear upon the target. If the instrument is in adjustment, the aluminium alidade at the other station will move with the auxiliary telescope, keeping parallel to it. The cross lines at the observing station being brought upon the target, the location of the target will be at the intersection of the straight-edge attached to the telescope, with the aluminium alidade operated in parallelism to the telescope of the auxiliary station.

The track of a vessel can thus be continuously traced, the two observers simply keeping the cross lines of their telescopes directed upon the vessel. It is necessary, of course, to make sure that both instruments are directed on the same point of the target. To this end it is necessary to have suitable means of communication between observers.

The method where one station and observer only is required is essentially a method of obtaining a location by polar coordinates. It presents many advantages over the two-station system. It involves having the observer at a known height above the sea level, which should, if possible, not be less than 100 feet, although fair work has been done with only 50 feet. The less the height the more important is it to know and apply for correction the height of the tide. It consists of a telescope mounted somewhat like a theodolite, with a device for multiplying the movement in the vertical plane as the angles to be read are very small. It also has adjustment for different heights, so that the range is obtained by direct readings upon the cross lines being brought to the intersection of the target with the water. Having the horizontal angle from the horizontal limb and the range from the vertical angle, the position of the target is accurately located on the map.

Major Watkins of the Royal Artillery has invented one of this form of range finders where the horizontal angle or direction of the target, as well as its distance, are automatically transmitted as many points as may be desired. The details of this apparatus are kept a secret, the English Government having paid the inventor £25,000 and £1,000 annually for 10 years. The value attached to an efficient method of range and position finding is thus tangibly indicated. While not wishing to belittle the ingenuity of the feat accomplished by Major Watkins Capt. Zalsky is of the opinion that some American electrician could produce apparatus quite as efficient. He regards it as a problem not to be lightly approached.

Lieut. Bradley Fiske, of the United States Navy has recently devised an electrical range finder which has much that is novel in that line and promises excellent results. Judged by preliminary experiments it will be of particular value for naval purposes, filling a place entirely unique and heretofore unattainable.

The Navy Department will soon issue proposals for the construction of a floating battery for coast and harbor defense, authorized by the last Congress. It will be a steel ship of the monitor class of 4200 tons burden, double turreted, and will be fitted with all the latest improved appliances. The designs for the ship were made in the Bureau of Construction and Repair. She will have a battery of four guns—two 16-inch and two 12-inch—the largest ever made in this country. The amount originally appropriated was \$1,000,000, but by a provision of the bill the final cost of the ship, exclusive of armor, should not exceed \$2,000,000, and the material used in the structure shall be, so far as practicable, of American production, and furnished and manufactured in the United States. The turrets in which the heavy guns are will be fitted with an improved deflecting armor.

Some months since Abram Reese, one of the oldest practical iron and steel workers in Pittsburgh, procured a patent on a process of re-rolling steel rails from standard sizes to those of small gauge. He at once tried to interest some of the capitalists of Pittsburgh in his invention with an idea of locating a plant in that city, but was unsuccessful. The next step of the inventor was to advertise his prospectus in the press of Chicago, with very satisfactory results. On Monday, the 12th inst., a company was organized in that city for the purpose of erecting a plant to utilize the invention. The company is composed of Abram Reese, Harry Reese, William Haslage and Thomas W. Davis, of Pittsburgh, and five capitalists of Chicago. The capital stock of the organization is \$200,000, all of which is

paid up. The site selected for the new plant is at Hartford City, Blackford County, Ind., a city of about 3000 population and located 167 miles east of Chicago. As an inducement to locate the new plant in that place the authorities offered 100 acres of ground in fee simple, which includes a natural-gas well with a capacity of 350 pounds pressure. In addition to this other liberal inducements were offered and accepted. Work will be commenced at once on the main building, which will be 80 x 160 feet. The railroad facilities are excellent and could hardly be improved upon. The object of the company is to roll old rails into smaller rails and also to manufacture splice bars and bolts for small rails, as well as spikes of proper sizes for small rails.

The Ohio and Western Coal and Iron Company blew in one of their new furnaces, at Floodwood, Ohio, on the 4th inst. Coke is used for fuel and the ores are a mixture of Lake Superior and native. They will make both a strong foundry and an open soft pig iron. The furnace is now running very successfully. The constructors guaranteed 125 tons of iron daily, and the indications are that the output will be much above that, using these materials. The furnace plant at Floodwood consists of two stacks, but it has not yet been determined when the other one will be blown in. These furnaces are 75 feet high and 17 feet in diameter at bosh, and have four Mackintosh & Hemphill blast engines, with 48 x 84-inch blowing cylinders. One furnace is equipped with fire-brick stoves and the other with iron-pipe stoves. The company also own the Helen Furnace, at Orbiston, and the XX Furnace, at Shawnee. The four stacks combined will have a capacity of 300 to 350 tons of pig iron daily. Pickands, Brown & Co., of Chicago, and Pickands, Mather & Co., of Cleveland, Ohio, are agents for the sale of the entire product now being made, which it is believed will find a ready market owing to its excellent quality. The Ohio and Western Coal and Iron Company is virtually a Boston institution, with some of the most energetic and capable business men in that city in its management. They have an excellent outlook before them, and it is to be hoped that they will be amply compensated for their large investments in this property, of which they secured possession 18 months since.

Bids were opened on Tuesday at the Treasury Department for the construction of a supply steamer for the lighthouse service, to be named the America, as follows: Neafie & Levy, of Philadelphia, \$194,000; Pusey & Jones, of Wilmington, \$174,000; Columbian Iron Works, of Baltimore, \$198,000; John H. Dialogue, of Camden, N. J., \$171,000. The last-named bidder also submitted alternative propositions to build the vessel with compound engines at \$163,000 and with triple expansion engines at \$171,000. There is an appropriation of \$175,000 for this vessel.

Last week the United States Rolling Stock Company, of Anniston, Ala., did a remarkably quick piece of work, concerning which the *Tradesman* gives the following details. "The bell at Woodstock Furnace No. 2 having fallen in, another had to be made. At 2 o'clock p. m. the metal was still in the shape of pig iron, and the large casting was made, taken to the machine shop and turned, and then drilled and delivered to the Woodstock Company at their furnaces before 4 o'clock a. m. Considering the size and shape of the casting, and the difficulty of handling and fastening it to the lathe, much credit is due for the exceedingly short time required to do the work."

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., November 20, 1888.

Pig Iron.—The market shows considerable steadiness considering the apathy manifested by a large proportion of consumers. The enormous furnace output is regarded as a protection against any material advance in prices, so that there is a general indisposition to do anything beyond covering requirements for 30 or 60 days ahead. Sellers are equally indifferent in regard to forward contracts, as they find their entire output taken for immediate consumption; and while this continues it is not worth while to bother about the future. The scarcity of Ores is another reason for the firmness in Pig metal, and until there is some prospect for lower cost makers are not likely to force their product on unwilling buyers. The market may, therefore, be considered quiet, but stubbornly firm, and for the present gives no indication of change in either direction. Consumption keeps up remarkably, but the season is at hand when curtailments may be expected, which fact, in connection with an increasing output at furnace, may lead to a little softening in prices toward the close of the year, although that will depend a good deal on the outlook for business during the early portion of 1889. As yet there is nothing in sight beyond the usual run of a good healthy demand. There is no large work on the market of any importance, without which it will be no easy matter to maintain prices on their present level. Elevated railway work is not likely to be important, although there is still a good deal of work to finish on old contracts. Architectural work on a large scale is not specially promising, but car building, bridge building and ship building promise considerable activity. All these important interests are in fairly good condition, but to secure a demand for the enormous capacity of mills and furnaces requires more than a moderate demand, and that is just where the uncertainty comes in. It is not that business is dull or likely to be so, but it is the immense capacity and the determination to utilize that capacity to its fullest extent that causes the uneasy feeling. Yet there may be business enough to satisfy everybody. In the meantime the work is not definitely in hand, and for that reason buyers are acting with the utmost caution until the outlook becomes more settled. Good brands of Iron are scarce, so that prices of such are naturally firm, and, while other descriptions are not in large supply, the offerings are large enough to prevent, for the present, any movement toward higher figures. Quotations, therefore, remain same as last week, say \$18 @ \$19 at tide for No. 1 Foundry, \$17 @ \$17.50 for No. 2, and \$16 @ \$16.75 for Gray Forge. There are a few special brands that command higher prices than here quoted, but the average for standard brands would be within the limits named.

Blooms.—A fair movement is reported, but without change in prices, which are about as follows: Steel Nail Slabs, \$29 @ \$29.50, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 @ "bloom" ton of 2464 lb.

Muck Bars.—The supply is somewhat limited, and although the demand is less urgent than it was some time ago, prices have been well maintained at from \$29 to \$30 at mill, according to quality, delivery, &c.

Bar Iron.—There is but little change to notice in the market since date of our last report. As a rule, there is plenty of business around, but irregularity in prices continues, as noticed during the past two or three weeks. It is, therefore, difficult to determine whether the market is shaping toward improvement, or the reverse. There are some indications of a favorable character, and the general sentiment inclines to that view of the market, but the irregularity in prices is rather discouraging to those who are looking for uniformity and firmness. A slight easiness in prices, and possibly some little falling off in the demand, may be met with during the next few weeks, but it may be preliminary to greater firmness and greater activity after the turn of the year. But it is impossible for any one to say with certainty what the outcome will be. There is plenty of business for the present, and there is no apparent reason why it should not continue. In many respects the position is peculiarly favorable, and it would be no surprise to many in the trade to meet with an extraordinary demand during the coming year. Meanwhile developments are carefully watched, and, while slight concessions may be obtained from those who are beginning to feel the necessity for new business, there is not enough in it to warrant the idea of a permanently lower range of prices. It is difficult to give exact quotations, but from 1.8¢ to 1.9¢ probably covers both ends of the market, although there are some mills in the vicinity that quote 1.95¢ @ 2¢, but they are full of work to the end of the year, which doubtless accounts for the difference in prices. Skelp Iron is not quite so much in demand, but mills are full of work for some time to come, and, it is said, could easily secure large additional orders at from 1.87½¢ to 1.9¢, but, in the meantime, 1.95¢ is asked without securing business.

Plate and Tank Iron.—There is a good demand for Plates, but competition is so very close that prices have not been fully maintained. As a matter of fact it is claimed that prices have been seriously cut in one or two specially desirable orders, and the same feeling prevails to some extent even among the smaller trade. In Steel Plates Pittsburgh is a sharp competitor, a good many important contracts having gone in that direction, including one for 2000 tons, a day or two ago, for one of the shipyards. Still, the local mills are nearly all busy, and if work comes out as expected it will not take long to stiffen prices back to the old figures. Meanwhile asking prices are about as follows, concessions being made according to quantity and class of material required: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.25¢ @ 2.3¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—New business comes in rather slowly, although the outlook is said to be very encouraging. Bridge material and ship material are likely to be in good demand during the winter and spring; and many manufacturers are feeling decidedly hopeful, although at the moment some of their departments are not fully employed. Prices are a little irregular, but in most cases about as follows: 2.05¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand has fallen off considerably, and although stocks are pretty well exhausted there is no difficulty in securing prompt deliveries on all new business. Small lots, best makes, are quoted as follows:

Best Refined, Nos. 26, 27 and 28.... 3¼ @ 3¼¢
Best Refined, Nos. 18 to 25.... 3 @ 3¼¢
Common, ¼¢ less than the above.

Best Bloom Sheets, Nos. 26 to 28.... 4¼ @ 4¼¢
Best Bloom Sheets, Nos. 22 to 25.... 4 @ 4¼¢
Best Bloom Sheets, Nos. 16 to 21.... 3½ @ 3½¢
Blue Annealed..... 2.8 @ 3 ¢
Best Bloom, Galvanized, discount..... 62½ ¢
Common, discount..... 67½ ¢

Merchant Steel.—The demand is about as usual, at prices as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—Reports from this market cannot be made to harmonize with those from other points. The usual asking price has been \$28.50 @ \$29 at mill, and it is doubtful if less than \$28 has been accepted at any time. It is stated on the highest authority that an order for 40,000 to 50,000 tons was offered to three mills at \$27.50 and by them declined. It looks, therefore, as if \$28 would be a rock-bottom quotation, and some well-informed parties are talking \$29 @ \$30 as likely to be ruling quotations before the end of the year.

Since writing the above we learn that the Pennsylvania order for 45,000 tons has been placed at \$28 at mill, divided between the Pennsylvania Steel Company, the Cambria Iron Company and the Carnegie Company.

Old Rails.—The offerings are very light, and as there is still a fair demand prices are steady at \$24, Philadelphia, for T's. Buyers offer \$23.50 for moderate quantities, but have not been able to secure supplies at less than \$24, which was the price on last sale reported.

Scrap Iron.—There is more disposition to buy, and prices are somewhat firmer, although usually quoted as follows: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—The demand has fallen off considerably, although there is still a great deal of business to be placed before the close of the year. Prices are irregular, and in some cases discounts have been increased, but as a rule they are quoted as before—viz.: Black Butt-Welded, 52½ ¢; Galvanized do., 42½ ¢; Black Lap-Welded, 62½ ¢; Galvanized do., 52½ ¢; Boiler Tubes, 60 ¢.

Nails.—The feeling is improving, but there is no change in prices as yet. Good brands are steady at from \$1.90 to \$2, and others at low prices seem to be less frequently mentioned than was the case some time ago.

Messrs. Amos H. Sheetz and Harry Stephen, the former having been selling for the past six years for McLanahan, Smith & Co., Limited, and the latter formerly of Stephen, Jones & Co., and long connected with Morris Wheeler & Co., have formed a partnership under the style of Sheetz & Stephen, as manufacturers' agents for Iron, Steel and Nails. They now represent McLanahan, Smith & Co. for their J. B. brand of Bar, Bolt and Nut Iron, and the Milton Mfg. Company, Nuts and Washers. Their office is at 206 Walnut place, to be removed after December 1 to the Drexel Building.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, November 19, 1888.

Pig Iron.—The condition of the market appears to be without any particular animation whatever, but still very firm and conservative. The demand is of a very healthy character, and contracts are being

made for round lots on a basis of prices that have been ruling for the past month or two. There is no disposition at all on the part of the producers to force sales, as their entire products are being taken away about as fast as made. The only trouble at the present time is the want of cars, and this, at times, is quite a serious obstacle in filling orders promptly, and, as yet, there appears to be no remedy in sight. The Eastern market now is the most eligible one, and shipments to the East are assuming large proportions, mostly via Savannah, Charleston and Brunswick. The output of the Southern stacks has been gradually increasing during the year, and furnaces that a year ago registered 80 and 90 tons are now producing 100 to 110, and in quality considerably improved. Besides this, there some four or five new stacks of large capacity that will soon go in blast, so that '89 may be looked upon as a year that will far excel any previous year in the history of the Southern Iron producing industry. Contrary to expectations Southern foundries are calling for more Pig than usual at this season of the year, which can only be accounted for by increased demand for their work.

The Southern Railway and Steamship Association have issued a circular, under date of 17th inst., clearly setting forth the conditions and requirements that govern shippers who make large contracts for future deliveries, and expect the same to go forward at the rates of freight ruling at the time such contracts are made.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington street, CHICAGO, November 19, 1888.

Pig Iron.—A very firm feeling is apparent in everything except Bessemer Pig Iron, and possibly Southern Coke. Makers of Bessemer Pig are disturbed over the low prices at which Steel Rails are being sold, and cannot resist the conclusion that they may have to bear their share of the depression in that branch of trade, which it now seems certain will extend over at least a considerable portion of next year. With the advance in Coke and dearer Ore, the outlook is decidedly discouraging for profits in the manufacture of Bessemer Pig. Although most sellers of Southern Coke Iron have adhered firmly to established prices, it has been found possible to secure a concession of 25¢ per ton from one of them during the week, and the further maintenance of current quotations will depend to a great extent upon the additional quantity of Iron available from that source. Furnacemen generally are not pushing sales at present, partly because they look for better prices soon and partly because they are fully aware that November and the early days of December are almost always very dull. Some of them are even now endeavoring to anticipate the future by marking prices up 50¢ per ton, but this movement is not general, and they may be obliged to reconsider their action later. Stocks are very light, however, and if the heavy buying expected in December materializes, they will be credited with the possession of remarkable foresight and good judgment. A few consumers are being influenced by the evident strength of the market to provide to some extent for their future requirements, but the volume of business has not been large, except in Lake Superior Charcoal. Of this Iron some 3000 tons were sold at full prices. The greater part of this was taken by Car-wheel manufacturers, who find their business improving through the demand for new cars, and who will require much more Iron, if appearances are not

very deceptive. We quote as follows for cash, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1 and 2, \$20; Nos. 3 to 6, \$20.50 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18.60; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband), No. 1, \$20 @ \$21; other Ohio Soft Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$18; No. 3, \$16 @ \$17; Southern Coke, No. 1 Foundry, \$17.50; No. 2 Foundry and No. 1 Soft, \$17; No. 3 Foundry and No. 2 Soft, \$16.25; Gray Forge, \$15.50.

Bar Iron.—Orders for Car Iron have been placed during the week at 1.72½¢ @ 1.75¢, flat, f.o.b. Chicago, the slightly higher prizes realized over last week indicating a better tone. A local railroad will place an order for 1000 Cars this week, the Iron for which will be bought subsequently. Miscellaneous specifications are now quoted at 1.75¢, half-extras, f.o.b. Chicago, for mill lots of Common Iron, but only a moderate business is reported in Iron for the general trade, the upward tendency in prices having probably checked purchases until a higher rate is thoroughly established. Manufacturers are notifying their agents to withdraw offers and to submit all propositions to them before closing contracts. Small lots are quoted from store at 1.85¢ @ 2¢, according to quantity and quality. Stocks are small.

Structural Iron.—The contract for Beams for a large office building is to be let this week, and the competition for it will probably be very keen. The outlook for Bridge work is better, as a number of projects in this line are maturing. About 1400 tons of such material will be contracted for this week. Mill orders are quoted as follows, f.o.b. Chicago: Angles, 2.15¢ @ 2.20¢; Universal Plates, 2.25¢ @ 2.30; Tees, 2.55¢ @ 2.65¢; Beams and Channels, 3.40¢. Small lots from store are quoted as follows: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—Business in Plates has been confined to small lots. Manufacturers who had long since forsaken this market are now soliciting here for Plates and Heavy Sheets, but those who regularly supply the local trade are apparently as busy as ever, deliveries being anything but prompt and options for even a reasonable length of time being refused. A novel feature in this market is an order for 25 tank cars, to be used in distributing oil from this point. From 25 to 50 more will probably be needed soon. Bids are now being received for the Iron. Tubes are nominally unchanged, but there are rumors of concessions by some of the manufacturers. Store prices are unchanged, as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60¢ off.

Sheet Iron.—The sudden change to cold weather during the week brought with it the long-expected demand on the jobbers for Black Sheets, and stocks have been run off rapidly. They quote small lots of No. 24 at 3.10¢, Nos. 25 and 26 at 3.20¢, and No. 27 at 3.30¢. Manufacturers' agents quote mill lots at 3¢ at mill, but this can probably be shaded for favorable deliveries.

Galvanized Iron.—The demand has been so good, and the mills are so far behind in their deliveries, that manufacturers' agents have in some cases been obliged to purchase lots from outside parties in order to meet the most pressing wants of their customers. Yet no change is reported in prices, small lots being still

quoted at 60¢ and 5¢ off for Juniata, and 60¢ and 10¢ off for Charcoal.

Merchant Steel.—Contracts have been placed for several hundred tons of Open-Hearth Spring Steel at about 2.40¢, f.o.b. Chicago. It is now quoted from stock at 2.50¢. Tire and Sleigh-Shoe Steel have also been in good demand, and consumers generally are disposed to take hold. Open-Hearth Machinery Steel is sympathizing to some extent with Spring Steel, but makers of choice qualities are adhering firmly to old quotations. We quote as follows from stock: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 3.75¢; Open-Hearth Machinery, 2.50¢ @ 2.75¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Less than 1000 tons appears to be the aggregate of the business done during the week. Very few more Rails will be needed this year, and inquiries for next year's delivery are discouragingly small at present. Local manufacturers continue to quote \$30 on Western business.

Old Rails and Wheels.—In this line nothing seems to be doing for lack of agreement between buyers and sellers. Sellers of Old Rails ask \$23.25, but buyers are not disposed to pay this price. They offer about \$1 per ton less. Consumers are stocked for the present in this vicinity, and the Mahoning Valley mills seem to be able to buy on better terms in other quarters. In Old Car-Wheels the market is stagnant, but dealers continue to quote \$19.50 @ \$20 as the rates at which business could probably be done.

Scrap.—More inquiry is noted, but sales have been limited, as consumers are not disposed to pay more than they have been giving. An occasional lot of 100 tons of No. 1 Forge is disposed of at \$20, but the local dealers generally ask from \$1 to \$2 more. Mixed Country Scrap is selling at \$14 @ \$15. Selling prices of carefully selected Scrap are as follows, per ton of 2000 lb: No. 1 Forge, or Railroad Shop, \$21; Track Scrap, \$20; Horseshoes, \$20; Axles, \$26; No. 1 Mill, \$15 @ \$16; Pipes and Tank, \$13; Light Wrought, \$11; Cast Machinery, \$14 @ \$14.50; Stove Plate, \$12; Cast Borings, \$9 @ \$9.50; Wrought Turnings, \$12 @ \$12.50; Axle Turnings, \$14.50; Coil Steel, \$15; Leaf Steel, \$16.50; Locomotive Tires, \$16 @ \$17.

Hardware.—The cold weather of the past week has greatly stimulated the demand for some lines of Shelf Hardware, and merchants would be pleased to see it continue. Trade in Holiday Goods has opened up well, and large quantities are being shipped of such goods as Skates, Sleds, Cutlery and other articles adapted to this particular demand. Staple Goods are heavy and moving but slowly. Collections are fair.

Nails.—Manufacturers' agents have not been favored with much actual business, but they are now receiving inquiries which promise to develop into orders shortly if terms can be arranged. Large buyers are anxious to negotiate at present prices for deliveries in January, February and March, when they will need good stocks of Steel Nails to meet the large demand usually experienced in those months. Manufacturers are not entering into such agreements with much enthusiasm, as the prices which would have to be made are anything but tempting to them. Another reason is also suggested. Although the great national pooling scheme has fallen through, and Steel Nails have apparently dropped into a condition of hopeless demoralization, there are indications that the manufacturers are not disposed to abandon all efforts to control the trade. They expect to be able to accomplish something through which the price of Nails will be advanced considerably before the 1st of

January. To make contracts for large quantities for future delivery would defeat the very object toward which their plans are directed. Wire Nails are understood to be firmly held, but they also are not moving freely. Steel Nails continue to be quoted at \$2 from store, \$1.90 for carloads on track, and less for large lots. Wire Nails are sold at \$2.60 from store and \$2.55 for carload lots on track.

Barb Wire.—A fair movement is in progress both in small lots and carloads. Large buyers are looking about sharply for bargains, but some of the manufacturers are holding off at present in the belief that better prices can be obtained after the cheap sellers have loaded up. Small lots are still quoted at 2.90¢ for Painted, and 3.60¢ @ 3.65 for Galvanized, with the usual difference for carloads.

Pig Lead.—Early in the week small quantities were sold at 3.60¢, but afterward bids of 3.55¢ were successfully made for 200 to 300 tons of Common, considerable sales of Refined also taking place. At the close 3.50¢ was bid, 3.55¢ asked.

Pickands, Brown & Co., of Chicago, and Pickands, Mather & Co., of Cleveland, are the selling agents for the Ohio and Western Coal and Iron Company, one of whose new furnaces, at Floodwood, Ohio, has just been blown in.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, November 19, 1888.

Pig Iron.—During the week under review the local market for Pig Iron has been full of vitality, strong, and at times even buoyant, if not excited. The volume of business has been large, numerous sales being made, both large and small. While there has been a general revival in the demand, the Iron most urgently sought for has been Forge grades. There has been scarcely a mill along the Ohio River and within the territory of Cincinnati which has not figured in the market during the week, if not as buyers at least as applicants. Car builders as well as Pipe manufacturers, and mills as well as machine shops, have contributed something to make evident the confidence prevailing. Mottled, Bright and off grades of Iron are wanted, as well as the better brands and grades, but the offerings are generally small. Several thousand tons of Car-Wheel Iron have been sold on basis of quotations, and also several thousand tons of Foundry grades, supplemented by a number of scattering transactions for various kinds for both present and future delivery, but by far the bulk of the sales have been of Forge Irons, the product of both Ohio and Southern furnaces, the latter stacks taking the lion's share. The aggregate sales of Mill Irons made during the week are estimated at 40,000 tons, one house alone booking orders for over 20,000 tons. These transactions were mostly for long delivery, and factors assert their ability to obtain 25¢ @ 50¢ per ton more for future than for present or near-by delivery. Prices of several grades are higher; a further advance is anticipated. The following are the approximate quotations for the local market cash, f.o.b. Cincinnati:

Hot-Blast Foundry.		
Southern Coke, No. 1 (new classification).....	\$16.25 @	\$16.75
Southern Coke, No. 2 (new classification).....	15.50 @	16.00
Southern Coke, No. 3 (new classification).....	15.25 @	15.50
Ohio Soft Stone Coal, No. 1.....	17.00 @	17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @	16.00
Mahoning and Shenango Valley.....	18.00 @	18.50
Hanging Rock Charcoal, No. 1.....	21.00 @	22.50
Hanging Rock Charcoal, No. 2.....	19.00 @	22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @	19.50
Tennessee and Alabama Charcoal, No. 2.....	17.50 @	18.00
Forge.		
Strong Neutral Coke.....	15.00 @	15.25
Mottled Neutral Coke.....	14.00 @	14.25
Gray Forge.....	14.50 @	14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	25.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Malleable.....	21.00 @	22.00

Manufactured Iron.—There has been some increase in the volume of business, the activity in Pig Iron and the hardening tendency spurring buyers to increased purchases, but prices of the manufactured product have changed but little. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ @ lb.

Old Material.—There has been some increase in the demand here for both Old Rails and Wheels, but the offerings have been fair; 400 tons Old Rails sold here at \$23, cash, and about an equal amount of Old Wheels at \$19, spot cash.

Nails.—The trading has been on a lower basis during the week, but there is a fair demand and a better feeling at the close. Jobbing prices are based upon 12d @ 40d, which sell at \$1.95 @ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$1.95 and Steel Wire Nails at \$2.65 @ keg.

Cleveland.

CLEVELAND, November 19, 1888.

Iron Ore.—During the past week 131,687 tons of Ore were shipped from the Upper Lake ports, bringing the total shipments for the season up to 4,572,913 tons. This amount is 71,741 tons in excess of the total shipments up to a corresponding period last year and 1,016,113 tons in advance of the record for 1886. The shipping season will practically close on December 1. Nearly all of the wooden vessels are already tied up for the winter, leaving only the steel steamers in commission. Two or three cargoes of unsold Ore were unloaded at this port during the week just closed and more will be brought down within the next ten days. But the total amount of Ore not disposed of on the docks at the close of navigation this year is likely to be less than 150,000 tons, as compared with 750,000 tons at the beginning of last winter. When it is taken into account that the last-mentioned stock of Ore has been disposed of during the past season, in addition to the 4,752,913 tons shipped, it can be readily seen that all records have been beaten, despite the depressing influence of a late opening and an uncertain and fluctuating market for Pig Iron. Although the Iron Ore market is far from dull, the activity noticeable is confined to the anxiety of buyers to secure odd lots of non-Bessemer, for nearly all of which fancy prices are secured. Special grades of non-Bessemer Ores have been bought as high as \$5.25, f.o.b. vessels, lower Lake ports, while less valuable brands, which sold in July for \$3.75, are commanding from \$4.25 to \$4.50 @ ton. It would be superfluous to quote prices for Bessemer Ores, for there are, practically, none to be had at any price. An odd lot of Gogebic Bessemer, not particularly rich in Iron, is said to have sold during the week just closed for \$5.85. Lake freights have not advanced, and Ore is still brought from Escanaba for \$1.25, from Marquette at \$1.55 and from Ashland and Two Harbors at \$1.70, rates which, at this season of the year, are considered reasonable.

Pig Iron.—If the result of the election has had any appreciable effect upon the Pig Iron market it has been in the direction of more active inquiry and of firmer quotations. There seems to exist no lack of confidence in the stability of the market. The furnaces are now so overwhelmed with orders that active buying is not expected to begin for 30 days. The foundry and mill men will then come forward for their supplies, and dealers look for

a volume of business with but few precedents. But little Iron is now being sold for delivery in 1889, and furnacemen seem willing to await the opening of the new year, and to trust present indications.

Manufactured Iron.—The mills are running full time in order to fill contracts, but there is little surplus Iron to sell. Bar Iron is firm at 1.70¢, but the stores are unable to obtain stocks, the mills shipping directly to the consumers.

Scrap Iron.—A few sales of Old American Rails at \$24.50 are reported. The water-works trustees sold to-day a big quantity of Cast Scrap for \$13 @ ton.

Sheets.—Stocks have been slightly replenished, and moderate quantities can now be obtained on the basis of \$3 for No. 27, and \$2.80 for No. 24.

Louisville.

LOUISVILLE, Ky., November 19, 1888.

Pig Iron.—Buying has been steady during the week, and parties who were slow in making purchases are now compelled to pay an advance. What this is it is almost impossible to tell, but we believe that Iron has advanced fully 75¢ @ ton. Buying throughout the West has not been general, and some points yet feel that the present upward movement cannot be maintained, and that the coming month will show a slight decline in prices. Those who are best situated to know the condition of trade and the amount of stocks now on hand feel that this is a mistake, and that a still further advance will take place. It is not thought the market will have a boom, nor is it considered desirable, but it is felt that present prices will be maintained, and that as orders come in of necessity a slight advance will be made from time to time. We quote as follows:

Southern Coke, No. 1 Foundry, new classification.....	\$16.50 @	\$17.00
Southern Coke, No. 2 Foundry, new classification.....	16.00 @	16.50
Southern Coke, No. 3 Foundry, new classification.....	15.50 @	16.00
Silver Gray, different grades.....	15.50 @	16.50
Gray Forge.....	15.00 @	15.50
White and Mottled, different grades.....	14.00 @	14.50
Hanging Rock Coke, No. 1 Foundry.....	17.00 @	17.50
Hanging Rock Charcoal, No. 1 Foundry.....	20.75 @	23.00
Southern Charcoal, No. 1 Mill.....	16.00 @	17.00
Southern Car-Wheel, standard brands.....	22.75 @	23.75
Southern Car-Wheel, other brands.....	19.00 @	21.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Hanging Rock, Warm Blast.....	19.00 @	20.00

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave., PITTSBURGH, November 20, 1888.

The most important event of the week was the action of the river coal operators, who, at a meeting yesterday, agreed to stop mining indefinitely after December 1st. This action was rendered imperative by the overstocked and depressed condition of the down-river markets, where it is difficult to make sales even at actual lay-down cost.

Pig Iron.—There has been no important change in the situation since our last report. Demand keeps up well, furnaces are all busy, some of them sold several months ahead, and the outlook is favorable for a good healthy trade all winter. Furnacemen think they should have a better price for their product, but consumers aver that they are paying all and even more than it is worth, when present prices of Finished Iron are taken into consideration. The indications warrant the conclusion that there will be a steady consumption throughout the winter, with but little change one way or the other in prices. We quote as follows:

Neutral Gray Forge.....	\$16.00 @	\$16.25, cash.
All Ore Mill.....	16.75 @	17.00, "
White and Mottled.....	15.00 @	15.50, "
No. 1 Foundry.....	18.00 @	18.50, "

No. 2 Foundry.....	17.00 @	17.50, "
No. 1 Charcoal Foundry....	23.50 @	24.00, "
No. 2 Charcoal Foundry....	21.50 @	22.50, "
Cold Blast Charcoal.....	25.00 @	28.00, "
Bessemer Iron.....	17.50 @	18.00, "

Some few sales of Gray Forge were reported at \$16.50, cash, but this price can only be secured for an extra Iron, as consumers have no trouble in getting all they want at \$16 @ \$16.25, cash. In regard to Bessemer, while there was a sale of 500 tons reported at \$18, cash, it was an extra lot, as \$17.50, cash, is nearer the mark for the ordinary analysis.

Spiegel.—Spiegel, 20 %, quoted at \$27.50 @ \$28.50, cash, and Manganese, 80 %, \$56.50 @ \$57.50.

Muck Bar.—The offerings continue light, and with some inquiry the market may be quoted firm at \$29 @ \$29.50, cash. Those mills making a specialty of Muck are pretty well sold up, and this accounts for the very limited offerings and strong market.

Manufactured Iron.—There is a continued fair degree of activity. Mills generally are pretty fully employed, and likely to be for some time to come. No change in Prices. Bars, 1.80¢ @ 1.85¢; Plates, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢; Skelp Iron, 1.85¢ @ 1.90¢ for Grooved, and 2.10¢ @ 2.12¢ for Sheared; all 60 days, 2 % off for cash.

Nails.—The price here is still quoted at card rates, \$1.90 for 12d to 40d, 60 days, 2 % off for cash, but cutting is still being done elsewhere. Wheeling is reported as having taken an order recently for 10,000 kegs, to go West, at \$1.65, net cash, 2000 kegs to delivered immediately and the remainder at stated intervals thereafter. Some of our manufacturers can scarcely believe that the order would be taken at Wheeling or any where else at the price quoted, but the broker who made the purchase gives it publicity, and, thus far, it has not been contradicted. It is claimed by those in a position to know that the price quoted does not cover actual cost of production.

Wrought-Iron Pipe.—There has been quite a falling off in new business within the past week or two, but the mills generally are still pretty fully employed in working up back orders. Business nearly always falls off at this season of the year, and no material improvement can reasonably be looked for until the spring trade opens up. Prices remain unchanged: Discounts on Black Butt-Welded, 52½ %; do. on Galvanized 45 %; on Black Lap-Welded, 62½ %; on Galvanized do., 52½ %; Boiler Tubes, 60 % off. Two-inch Tubing, 18¢ ¾ foot, net; 5½ inch Casing, 40¢ ¾ foot, net.

Billets, &c.—Bessemer Steel Billets are quoted at \$29, cash, at maker's mill and Nail Slabs, \$28.50; market for both easier. Domestic Bloom Ends quoted at \$19, and Rail Crops at \$19.50, the latter are reported scarce. A sale was lately made of 4000 tons of Wire Billets to a New England mill.

Old Rails.—There appears to be less inquiry, but with scant offerings prices are still maintained. Sales reported at from \$24.85 to \$25.25, cash. With the advent of cold weather, which cannot now be much longer delayed, the work of lifting will be very much curtailed, and it is expected, therefore, that the offerings will fall off in consequence.

Steel Rails.—Heavy sections are still quoted at \$28 @ \$28.50, cash, at mill; several sales reported at \$28.25. The sale reported some weeks ago in the East by the new mill here at \$27.50, cash, delivered at Buffalo, was for a special lot, which was wanted to test the machinery of the new mill which, as stated elsewhere, will, it is expected, be started up in

January. We learn from good authority that no Rails can be purchased here below prices quoted, and even at these there is but very little margin for profit. It is stated that a good many orders have been booked within the past few weeks by nearly all the mills in the country. New Steel Rails are only worth about \$3 ¾ ton more than Old Iron Rails.

Railway Track Supplies.—Spikes are still quoted at \$2.20, 30 days, delivered; Splice Bars, 1.85¢ @ 1.90¢; Track Bolts, 2.85¢ with square, and 2.95¢ with Hexagon Nuts.

Merchant Steel.—There was a meeting of the Bessemer Steel Association the other day, but there was no change made in prices. Best Brands of Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-Hearth do., 2½¢.

Old Material.—There is a fair business at unchanged prices. No. 1 Wrought Scrap at \$21, net ten; Wrought Turnings, \$13 @ \$14; Car Axles, \$25.50 @ \$26.50; Cast Scrap, \$15.50 @ \$16.50, gross ton; Cast Borings, \$12 @ \$13; Old Car-Wheels, \$20.

Naylor & Co., the well-known importers, will shortly open a branch office in the Lewis Block, Pittsburgh. A. S. Hay, a member of the firm, and A. Holland, the prospective Pittsburgh representative, were in this city last week, making the necessary arrangements for the opening of the new office.

Detroit.

WILLIAM F. JARVIS & Co., under date of November 19, report as follows: There has been an improvement in the market since our last report, and a larger number of small orders have been placed. Several inquiries for round lots for delivery after January have been received, some of which will undoubtedly result in orders. The continued scarcity of cars is causing great inconvenience to furnaces that have Iron on hand, as they are unable to ship it on this account, and as a natural consequence consumers are complaining loudly at the delay. The outlook is encouraging and prices are held firm. Navigation on the lakes will soon be closed and this may cause some advance in Lake Superior Charcoal, as only a limited number of furnaces can ship during the winter to Eastern points, as freight rates from upper lake furnaces are too high. We quote for the present as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @	\$20.50
Lake Superior Coke, all ore.....	19.75 @	20.25
Lake Superior Coke, cinder mixed.....	18.50 @	19.00
Standard Ohio Black Band.....	19.75 @	20.25
Southern No. 1.....	17.75 @	18.25
Southern Gray Forge.....	16.25 @	16.75
Southern Silvery.....	17.00 @	17.50
Jackson County (Ohio) Silvery.....	18.50 @	19.00
Old Wheels.....	20.50 @	21.50

New York.

Office of The Iron Age, 66 and 68 Duane street, New York, November 21, 1888.

American Pig.—The volume of new business being done is light, and the number of inquiries for forward delivery is not large. Still, the market is steady and the tone healthy. Some propositions have been made for delivery of Southern Iron next year, but it is stated that sellers must take the risk of freights, since the railroads decline to guarantee rates for 1889 delivery to be the same as now—\$4.86 to New York and \$5.11 to Boston. One case has come within our notice where a Southern furnace company have declined to book more than one quarter of a 5000-ton lot, which the consumer was willing to take. We continue to quote Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is very quiet, with prices remaining: Coltness, \$21 @ \$21.50, nominally; Shotts, \$20.75 @ \$21; Langdon, \$21, and Dalmellington, \$20 @ \$20.25.

Spiegeleisen.—No business has been done and prices remain nominally \$27 for German 20 %. Ferromanganese, 80 %, prompt delivery, has sold in small lots at \$54.

Wire Rods.—The market is very dull and weaker, Basic Wire Rods having sold at a delivered price equivalent to \$38.65 at this port. The demand for foreign stock is shrinking more and more, and is now practically confined to the Eastern Wire, Barb Wire and Wire Nail mills which do not roll their own Rods. It is probable that next year the importations will fall off even more. The West is now practically captured by the domestic mills. With the new Rod mill building at Anderson included, the mills of this country will be able to turn out next year somewhere between 300,000 and 350,000 tons. It is urged by importers that they cannot long hold the Eastern trade unless foreign Rods are kept low enough to put Eastern Wire mills in a fair position to hold their own against their Western rivals. They argue that from the standpoint of the foreign Rod maker any attempt to exact high prices would be suicidal. On the other hand it is insisted that for the present foreign Rods are as cheap as they are likely to be so long as the price of Billets abroad remains where it is. Even when the German Rod combination was in existence there was so little margin in rolling Rods that only five or six concerns remained in the business, and even one of the most prominent of them changed one of its mills to light Rails. We quote the market dull at \$38.75 @ \$39 for Basic Rods, with the probability that \$38.50 could be done.

Old Rails.—We hear of a sale of 1200 tons on the line of a road in Western Maryland at \$23, and of a lot of 500 tons at \$23.50, on the cars Jersey City, shipped from Bridgeport, Conn. A number of mills in Eastern Pennsylvania are in the market, but the supply available here is small and generally closely held. We quote \$23 @ \$24 for Tees for large lots.

Scrap.—The market is quiet, but steady, at \$21 for Yard, with few sales reported.

Plates.—Fair orders for Marine Steels have been placed here, and we learn that the Steel Plates for 19 boilers for a Brooklyn sugar refinery were taken by a mill in Eastern Pennsylvania. One of the leading Western mills selling in this market has taken an order for about 2000 tons of Ship and Boiler Plates at Philadelphia, the Angles, Deck Beams, &c., going to an Eastern Pennsylvania mill. We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.44¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.5¢ @ 2.55¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—A number of the mills complain of a falling off of orders. Some of the big contracts which nearly every prominent mill had as a *pièce de résistance* have now been filled, only one mill having received additional work of this character lately in the form of about 6000 tons of Brooklyn Elevated construction. The largest Beam mill in the country has gone on single turn. We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢. Foreign Beams can be laid down at about 2.65¢ @ 2.75¢, but are in very light demand.

Bar Iron.—The scarcity and high price of Old Rails have caused some of the mills to which this market is tributary to with-

draw; still the market is not perceptibly stronger. We quote: Carload lots, half extras, 1.7¢ @ 1.75¢ for Common; 1.75¢ @ 1.8¢ for Medium, and 1.8¢ @ 1.9¢ for Refired, with prices for fancy brands running up to 2.4¢ @ 2.5¢. Foreign Hoops are quoted nominally 2.05¢.

Steel Rails.—The event of the week has been the placing of the greater part of the order of the Pennsylvania Railroad; three Pennsylvania mills on the line of the road receiving each 15,000 tons, with the important proviso that they may deliver the Rails at any time during the winter. The railroad generally places at the same time a number of smaller orders in Chicago, Cleveland and Scranton, aggregating about 15,000; so far as we can learn, these have not yet been given out. It is stated that the Rails were placed at \$28 at mill, a figure which the trade regards as somewhat high, considering the market of the past few weeks, and which it is somewhat difficult to explain, even when the fact is considered that the road has the advantage of carrying a very heavy tonnage of raw materials for the manufacture of the Rails. We are informed that one of the mills not on the line of the road has offered to sell at \$27.50. The contracts are of special importance, because at least one of the mills, and possibly others, have made sales to other lines based upon the Pennsylvania price. It is intimated that in the case of at least one mill a balance of last year's order, at a considerably higher price, has been cancelled, by the placing of the new order. We hear of sales to Eastern roads aggregating about 4000 tons, and of 5000 tons to the Pacific Coast. The latter was \$2 under the price at which English Rails were offered, delivered, so that at a lower rate of duty the domestic mill would have been crowded out, even on the basis of the low price of \$27.50 at Eastern mill. In the West a contract of 17,000 tons, to be delivered in about equal parts at Omaha and Kansas City, has probably been placed. The market is firmer, though not without a shade of irregularity, the usual quotation being \$27.50 @ \$28. According to the report of the Board of Control the deliveries up to the 1st of November were 1,029,179 tons, the sales for 1888 delivery being 1,250,740 tons. For 1889 the sales are reported at 116,180 tons up to November 1st, but it is certain that at least 150,000 tons have been placed since then. In regard to the rumors persistently circulated for some time past of a disruption of the Rail Association, or at least of a growing dissatisfaction among some of the members, it may be stated that whatever grounds there may have existed for it are likely to be removed in a few days.

Financial.

While there is visible no strong impetus in business circles—especially in the absence of speculation—in several respects there is an improvement compared with ante-election days. Tariff questions being at least temporarily set at rest, those industries more directly affected manifest greater confidence, and the same holds true of certain branches of trade, notably those identified with the wool product. Many enterprises awaiting the decision at the polls are being pushed forward. Money is easy and no apprehension is felt respecting the immediate future. Contentment among the great railroad corporations still occupies a prominent place in public estimation. The Classification Committee has finished its report, which will conform to the requirements of the Interstate Commissioners, and, in revising classes, most freights have been graded up, so that the railroads must make heavier revenues. Commissioner Fink has called for a telegraphic vote for the adoption of this new

classification, and, from present appearances, the members of the Joint Executive Committee will unanimously approve of it.

The Stock Exchange markets are comparatively dull, with limited transactions. Rumors respecting trunk line troubles and prospects are the chief disturbing factor. It is conceded that railroad business throughout the country has sustained a severe shock, but traffic continues heavy. Shipments east from Chicago for the week were 36,586 tons, an increase of 5630 tons compared with the previous week. On Monday selling orders from London encouraged bear raids, and the trunk line stocks were the principal sufferers. A favorable development in the trunk line situation is the promised adoption by all lines of the recommendations of the Classification Committee, which grade up most classes of freight, and will, it is thought, enable the roads to secure a heavier revenue for hauling the same tonnage. Among other reports is the existence of an agreement designed to protect the roads from alleged infractions of the Interstate law. The New York and New England is receiving some attention, owing to the approach of the annual meeting, and to the anticipated improvement looked for after the opening of the Poughkeepsie Bridge early in 1889, which is expected to increase materially the road's coal traffic. On Monday the market was irregular. It was announced that a meeting of managers of Northwestern and Western railroads had been called in Chicago on Wednesday, to endeavor to formulate an agreement covering all the Western lines. It was also learned from Washington that the war of rates between the trunk lines has received the serious attention of the Interstate Commerce Commission, but that body, while deploring the existing troubles, has failed thus far to find any remedy for them or any authority to exercise any remedy. Judge Cooley, chairman of the commission, says: "In the absence of legal proof of secret reductions of rates we cannot institute suit, as we would be glad to do if testimony were offered to us upon which we could proceed." Members of the Interstate Commission do not believe that Congress will enact any legislation repealing the prohibition of pooling, and they do not think that permission to pool would permanently improve the present situation. They hope that the coming meeting of the trunk line presidents will result in a settlement of the traffic war.

Government bonds were stronger for the 4s, which sold at 128. Quotations are as follows:

U. S. 4s, 1891, registered.....	107½
U. S. 4s, 1891, coupon.....	108½
U. S. 4s, 1907, registered.....	128
U. S. 4s, 1907, coupon.....	128
U. S. currency 6s.....	121

The Treasury purchases of bonds continue quite small, partly for the reason that the offerings at the figures the secretary is willing to pay have fallen off materially. The effect upon the financial situation, however, is imperceptible.

The total clearings of 41 cities last week show a decrease of 9.5 % compared with the corresponding week last year; outside of New York the decrease is 6.7 %. New York decreased 14.1 %; Philadelphia, 6.1 %; Chicago, 6.9 %; Baltimore, 6.1 %; Cincinnati, 5.6 %; New Orleans, 4.8 %; Pittsburgh, 3.9 %; St. Paul, 5.6 %; Galveston, 21.6 %; Wichita, 35.9 %; Los Angeles, 35.9 %; Duluth, 45.10 %; Boston increased 4.9 %; St. Louis, 3.9 %; San Francisco, 10.9 %; Kansas City, 9.4 %; Minneapolis, 14 %; Omaha, 18.2 %; Memphis, 16.9 %, and Denver, 27.5 %.

The weekly bank statement shows a small but unexpected increase in the surplus reserve, which now stands at \$11,591,000, against \$7,488,000 at the corresponding time last year and \$9,930,000 in the third week of November, 1886.

The loans were contracted \$983,000; specie decreased \$1,288,900; legal tenders are up \$1,234,900, almost equal to the loss in specie. Money is still wanted in the South, but the West has no special requirements. Loanable funds in this market are in better supply, and the demand for commercial paper is good. We quote 60 @ 90 days' indorsed paper at 4½ @ 4¾ %; longer dates, 5 @ 5½ %; single names, 5½ @ 6 %. The Treasury Department issued a circular announcing that no more deposits to retire circulation will be received until December 1, as the \$3,000,000 monthly limit has been exhausted.

Sterling is very firm, owing to the advance of the rate of discount in London. Posted rates are \$4.85½ @ \$4.89.

The Produce Exchange markets generally have a lower tendency. Wheat is lower, with an increasing visible supply and on Tuesday prices fell off 3¢. Flour is dull and lower. The only export business at present is on account of the Lisbon market, the movement having become rather important since the decline. Nearly all the Western millers are now running on half time to permit an absorption of the surplus product, as well as on account of the relatively high price of grain. Corn lower, with liberal sales for export. The demand for wool is phenomenal, sales in Boston during the week having amounted to 8,847,000 lb, the largest ever known, and the advance is at least 2¢ on nearly all grades. Philadelphia carpet manufacturers announced an intended advance in prices, but the alternative of a 10 % reduction in wages is now under consideration. New York dry goods jobbers report a healthy trade.

Exports of merchandise from this port during the week were valued at \$8,490,997, making a total since January 1 of \$411,033,625, as compared with \$415,545,000 for the same time in 1887 and \$386,353,000 in 1886. The recent favorable balance of trade is due to the increased exports of cotton, breadstuffs and provisions showing a material decline. In breadstuffs the decline is in wheat only. For the last four months the aggregate of the five principal classes of exports from the United States compare as follows:

	1888.	1887.
Cotton.....	\$48,745,171	\$59,796,471
Breadstuffs.....	43,257,353	53,867,109
Meat and dairy products.....	29,305,542	31,664,068
Cattle and hogs.....	4,733,335	3,388,674
Mineral oils.....	17,351,359	16,428,381
Totals.....	\$143,982,760	\$165,131,708

The imports of specie at this port during the week were \$393,000; exports nominal.

Metal Market.

Copper.—Spot Chili Bars have fluctuated 2/6 from day to day, closing the same as a week ago. £78. 2/6, but futures declined from £79 to £78. 15/, good merchantable brands giving way from £78. 2/6 to £78, and Best Selected from £83 to £82. 10/. Sales, 425 tons. Here the same listless tone and almost total lack of trade and speculation has continued, only 25,000 lb, November, being sold at 17½¢, the quotation for November, December and January being 17¢ @ 17½¢, spot nominally 17½¢, and casting brands 16¢ @ 16½¢.

Tin.—During the week under review spot Straits improved in London from £102. 12/6 to £103, and futures from £101. 7/6 to £101. 17/6, the sales summing up 1110 tons. There has been greater animation here, some 150 tons changing hands at 22.45¢ January, 22½¢ February, and spot at 22.35¢. The Straits shipped this way, November 1 to 15, 200 tons, against none last year, and to England 500 tons, against 800; to England altogether since January 1, 16,000, against 13,800, and to this country 8150, against 4100, as per cable from Gilfillan, Wood &

Co. to Mr. Charles Nordhaus, East-India agent, 89 Water street, New York. *Tin Plates*.—The demand during the week has again been quiet, the trade holding off their orders, as the market has been a declining one. We quote at the close, large lines, $\frac{3}{4}$ box: Siemens-Martin Steel, Charcoal Finish, \$4.90 @ \$5.75; Coke Finish, \$4.70; Ternes, \$4.10 @ \$4.25; Bessemer Cokes, \$4.25 @ \$4.35; and Wasters, \$4.15. Cokes are 13/8 @ 13/6 at Liverpool.

Lead.—Our market has been moderately active only, some 500 tons being sold in the open market at 3.65¢ @ 3.70¢, and 116 tons on 'Change, this also being the closing quotation, at which the market winds up quiet, while in St. Louis there is steadiness, but also a tame state of affairs, at 3½¢. London is 2/6 lower for the week, and quotes Soft Spanish £13. 2/6, and English Pig £13. 12/6.

Spelter.—Has been dull and featureless at 5½¢ @ 5¼¢ Common Domestic, and 6¢ Silesian, nominally, the London market having given way from £18. 12/6 to £18. 2/.

Antimony.—Hallett has improved £1 in London, to £44, while here a fair demand has prevailed at 10¼¢, and for Cookson at 12¼¢.

New York Metal Exchange.

The following sales are reported:

THURSDAY, November 15.		
30 tons Tin, January	22.30¢	
10 tons Tin, February	22.30¢	
25,000 lbs. Lake Copper, November	17.50¢	
FRIDAY, November 16.		
100 tons Lead (on dock)	3.65¢	
SATURDAY, November 17.		
10 tons Tin, December	22.45¢	
MONDAY, November 19.		
50 tons Tin, February	22.50¢	
40 tons Tin, January	22.45¢	
TUESDAY, November 20.		
16 tons Lead, January	3.75¢	

Coal Market.

The Anthracite Coal trade is dull and weak, under excessive production and decreasing demand. All sizes are now in full supply, even Stove having become abundant. As a consequence reports are freely circulated of cuts made in order to stimulate sales. The one phenomenal fact of the week, and which cannot fail to engage attention, is the enormous shipments from the mines, the Wyoming region especially seeming to be in full activity, and this in the face of the official announcement that the production for October was in excess of any month in the history of the trade, aggregating no less than 4,187,000 tons. For the week ending November 17 the total is 902,530, an increase of 126,000 over the previous week and 144,500 tons compared with the same week in 1887. Schuykil is increased 10,000 tons, Lehigh 12,000 tons and Wyoming 103,000 tons. For the year since January 1 the aggregate is 33,861,000 tons, an increase of 3,386,000 compared with the same time last year. The Reading Company will mine on full time until the end of the month, when it will come down to three quarters time, and probably all the other companies with it. The four new collieries that the Reading Coal and Iron Company proposes to open will be in operation about a year hence, making in all an addition of 1,000,000 tons per annum. The new improvements will cost about \$150,000. It should be noted that despite the heavy output from the Coal regions the stock on hand at tidewater shipping points October 31 was 359,000 tons, a decrease of about 12,000 tons during this month. Prices are nominally unchanged, as follows: Hard

White Ash, Lump, \$4.50; Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Free-Burning, f.o.b., Broken, \$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.65; Pea, \$2.75.

It is understood that the Coal operators assume that the market will, with Thanksgiving Day interruption, take all the Coal arriving at tidewater, but they will probably take action on the 29th to restrict.

Bituminous Coal is easier, with signs of an approaching overstock and possible temporary suspension at the mines.

The Lehigh Valley Railroad, in the suit brought against it by Cox Brothers & Co., has filed an answer denying nearly everything that is stated in the complaint, but admits carrying Bituminous Coal for but little more than half the price of Anthracite per ton per mile, and states that it costs more to load and unload Anthracite Coal than it does Bituminous.

At a meeting of Pittsburgh operators on Monday it was unanimously decided to shut down all the Monongahela River lines for an indefinite period.

The Poughkeepsie bridge will be opened for business February 1, taking Anthracite from Pennsylvania direct to the East side of the Hudson.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Nov. 21, 1888.

The recent advance in the syndicate's nominal prices for Copper, followed as it has been by a partial reaction, has tended to strengthen the belief that the interest mentioned can fully maintain prices only by following their former policy of requiring a guarantee that Copper purchased from them will not be resold. As it is, smelters who purchased prior to the late advance are underselling present syndicate prices, and it is believed that they will continue to do so for some time if these figures are maintained. Some significance is, however, attached to the fact that the supply has increased only 1000 tons the past fortnight—the smallest accumulation for any two weeks since January. This is attributed, in part, to the withholding of supplies at mines owned by the syndicate or members of the body. Copper furnace material shows, relatively, greater firmness than Bars, but the advanced prices asked early in the month have not been realized. James Lewis & Son report sales, since the 1st inst., of 2000 tons Anaconda Matte at 15/6, to arrive, delivery at Swansea, and 87 tons Matte, made from American Ore, at 15/ $\frac{3}{4}$ unit.

It is stated, on apparently good authority, that English capitalists have made an offer of £1,000,000 for the Sotiel Copper mines, Portugal.

Speculative operations in Block Tin have been on a larger scale, and prices have hardened somewhat the past few days. The "bear" interest have sold futures with more or less freedom, and express confidence in heavy shipments from the East the next few months, swinging prices in their favor. The "bull" party, however, appear inclined to make a stubborn contest.

Business in Tin Plate has been disappointing. Makers have granted concessions on prices to attract orders for forward deliveries, but the response from buyers is thus far slight. The production is now

very large, and promises to be even greater in the near future, additions to old mills and the erection of new plant having enlarged the capacity considerably. A site has been selected for the large works to be erected at Llanelly, Carmarthenshire.

In Pig Iron warrants operations have been on a moderate scale. Although stocks in Connal's stores are still increasing, the probability of enforced restriction of output consequent upon a scarcity of coal restrains bear sales. The large stocks of warrant Iron and the high rate of interest for money, on the other hand, adversely affect outside speculative purchases, causing as they do the belief that prices are likely to decline. Purchases for consumption are very fair, but the export trade is moderate. Only slight changes have taken place on makers' brands of Scotch Iron, but Middlesboro' and Hematites are lower.

A new brand of Iron, styled Sellivara, the product of Swedish Ores, has been placed on the market. Sales of this article are said to have been made at 55/ for Forge grade, and 57/6 for qualities suitable for foundry work.

In Shipbuilding and Railway Steel there continues to be a brisk business; prices very strong on the former, but still somewhat uneven in the instance of Rails. Billets also continue in good demand, but Blooms, Slabs, Rods, &c., are quiet. The Moss Bay Company have secured an order for 14,000 tons of Rails for the Bengal and Nagpur railway. The Crawshaw Steel Works and the Star Iron Works have been started up.

The report is again in circulation that a syndicate is forming to control the rolling mills in Great Britain and on the Continent.

Scotch Pig.—There has been only a moderate business, but prices hold fairly steady.

No. 1 Coltness, f.o.b. Glasgow	49/
No. 1 Summerlee, " "	49/6
No. 1 Gartsherrie, " "	47/
No. 1 Langloan, " "	48/6
No. 1 Carnbroe, " "	43/6
No. 1 Shotts, " at Leith	48/6
No. 1 Glengarnock, " Ardrossan	47/6
No. 1 Dalmellington, " "	42/3
No. 1 Eglinton, " "	41/
Steamer freights, Glasgow to New York, 6/6, Liverpool to New York, 10/.	

Cleveland Pig.—The market has been dull and prices have again weakened. No. 1 Middlesboro', G.M.B., 36/; No. 3 do., 33/6 @ 33/9. •

Bessemer Pig.—Prices are irregular and weak, the demand being slow and supply liberal. West Coast brands, mixed numbers, 44/3, f.o.b. shipping point.

Spiegeleisen.—Transactions have been of moderate volume, but offerings are moderate and prices steady. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—There continues to be a lively business, but orders are filled at former prices. Standard English sections quoted at £3. 18/9, and light sections £4. 2/6 @ £4. 7/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—Only a moderate business, and prices unchanged. We quote £4 for 7 x 7, f.o.b. at N. W. England shipping point.

Scrap Iron.—There is but little demand and the sales making are at former prices. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Steel Billets.—The demand continues fairly active. Makers are well sold ahead and firm on prices. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Moderate sales making at about former prices. Bessemer, £4, f.o.b. at N. W. England shipping point.

Old Rails.—Very little doing in these. Prices are nominal in a good measure. Tees quoted at £3. 3/9 @ £3. 5/, and Double Heads £3. 8/9 @ £3. 10/, c.i.f. New York.

Crop Ends.—The market quiet, but steady. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—There has been a fair business at barely steady prices. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/ @ 15/6
IC Bessemer steel, Coke finish.....	13/9 @ 14/
IC Siemens.....	13/9 @ 14/
IC Coke, B. V. grade.....	13/3 @ 13/6
Charcoal Terne, Dean grade.....	12/ @ 12/6

Manufactured Iron.—In most branches there is a fairly active trade and prices remain firm. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars.....	£ s. d. @ 8 2 6
" Common.....	@ 5 10 0
Staff. Blk Sheet, singles.....	@ 7 10 0
Welsh Bars (f.o.b. Wales).....	5 0 0 @ 5 2 6

Tin.—Operations have been on a more liberal scale, and prices, while irregular, show greater firmness. Straits quoted at £101, spot, and £101. 15/ for three months' futures.

Copper.—Business slow, and prices somewhat unsettled. Chili Bars, £78, spot, and £78. 10/, three month's futures. Best Selected, £82.

Lead.—The market is very quiet, but steadier. Soft Spanish, £13. 2/6.

Spelter.—Demand has been light, and prices are rather lower. Silesian, ordinary, £18. 2/6 @ £18. 7/6.

Foreign Markets.

EQUIVALENTS.		Cents.
Franc, Peseta or Lira.....		19.5
Florin (Netherlands).....		40.2
Florin (Austria).....		35.9
Milreis (Portugal).....		\$1.08.
Milreis (Brazil).....		54.6
Mark (Germany).....		23.8
		Pounds.
Kilogram.....		2.205
Picul.....		134.

CHILI.

VALPARAISO, September 14, 1888.—**Copper**—has been fluctuating very little, in consequence of the firm cable reports, and what little change there was was due to the varying exchange. Sales amounted to 18,759 quintals at \$29.55 @ \$30.30, which at 26½d., and taking \$29.65 as first cost, equals f.o.b., without freight, per steamer, £77. 6/2. **Nitrate**.—A good inquiry has prevailed, both for immediate shipment and September and October, but as very little Nitrate was immediately available, and suitable vessels were scarce, sales were limited to 170,000 quintals 95% at \$2.80 and 64,000 quintals 96% at \$2.85 @ \$2.87½. The price of \$2.80 equals, cost and freight, ½ cwt., 8/8½. November and December delivery was offered at \$2.80, without pressure. The closing quotation for 96% is \$2.87½. August shipments to Europe amounted to 57,000 tons, and to the United States to 5000. There remained loading on the 1st inst., for Europe, 75,800 tons, and for the United States, 8000 tons. Charters during the fortnight reached 34,810 tons for Europe and 2270 tons for the United States. **Coal**.—Cargoes arrived were by no means easily saleable, so that for Newcastle 25/ @ 26/ ½ ton had to be accepted. July sail brought 28/; later shipments, such as August and September, cannot be had under 35/ @ 36/ as, with the prevailing high freights, not many arrivals are likely. **Exchange**.—Bills on London 90 days' sight, have been sold at 26½d @ 26¼d.—*Weber & Co.*

EAST INDIES.

PENANG, October 4, 1888.—**Tin**.—During the fortnight there were receipts of, alto-

gether, 10,500 piculs, of which Europeans took 4780 and Chinese about 6000. The market opened at \$38.45 ½ picul, at which Chinese bought; subsequently there was an improvement to \$38.92½, but, later on, a rising exchange was followed by a reaction in Tin, the latter declining to \$38.60, at which Chinamen again bought to-day, the demand for China remaining quite lively. *Gum Benjamin*—of the better descriptions—has been taken, to a moderate extent, at \$53 @ \$56 per picul.—*Schmidt, Kustermann & Co.*

SWEDEN.

STOCKHOLM, November 7, 1888.—**Iron Ore**.—The general impression in Sweden and Norway is that the Lulea-Ofoten Railroad is going to prove a paying affair anyway, even if the cost of building should exceed the estimate so far made considerably. If the export of Ore at any time reaches 1,500,000 tons, the original investment of capital and preferred bonds would begin to draw interest, and if the export should further increase the shareholders will receive dividends. The railway all the way to Gellivara measures 132 English miles in length and is in working order, but there are great engineering difficulties a distance of 22 to 25 miles over the mountains on the track to Ofoten, a distance of 176½ English miles, the difficult portion being estimated to cost something like £20,000 ½ mile, while the rest will cost probably £4000 ½ mile. After the latter railway of 176½ miles is finished the owners of the mines and railroad will be able to lay down the ton of Ore at 16/ in England, and at such a price, or more, millions of tons can be easily sold. In England the Gellivara line, so far as built, is considered well constructed, whereas the Swedish engineers are of a different opinion, condemning as they do the building on frozen ground. The Ore shipping season at Lulea has been brought to a close now for the current year, shipments aggregating 54,200 tons in 30 steamers.—*Dagbladet*.

RUSSIA.

ODESSA, November 8, 1888.—**Petroleum**.—Baron Rothschild, head partner of the Parisian house, is at present at Baku for the purpose of personally inspecting the Naphtha works on the spot and determining what may be done in order to extend all the business of the Caspian Black Sea Naphtha Company. He also intends buying still larger tracts of land in Transcaucasia, not only for the Oil that may exist there, but also for the laying out of vineyards and the making and exporting of wine after the French fashion. So far the borings for Oil at Tiflis have produced no result. The depth of 40 fathoms has been reached, but the pressure of water is such that progress is slow. That Oil exists on the spot the natural wells abundantly prove. Perhaps a greater chance of striking Oil may be in the neighborhood of Baku. There are Oil wells between Tioneti and Tiflis all the way down to the Caspian, but it has yet to be shown that the borings will prove productive in the locality. Some boring is also going on at Elizabetopol and vicinity, with no better result so far.—*Odessa Gazette*.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from November 10 to November 17, inclusive, and from January 1 to November 17, inclusive, were as follows:

Iron and Steel.			
	Nov. 10 to Nov. 17.	Jan. 1 to Nov. 17.	
Iron Ore: A. Earnshaw.....	250	8,837	Tons.
Pig Iron: Crocker Bros.....	1,565	13,357	Tons.
N. S. Bartlett.....	300	5,300	
Dana & Co.....	150	1,051	
James Williamson & Co.....	100	5,800	
R. F. Downing & Co.....	100	300	
Spiegeleisen: Crocker Bros.....	208	11,313	
Kessler & Co.....	120	120	
J. Abbott & Co.....	100	850	
Dana & Co.....	20	3,973	
Steel: Thos. Prosser & Son.....	72	180	
W. F. Wagner.....	43	1,347	
R. H. Wolf & Co.....	33	618	
M. Cohn.....	15	235	
J. Abbott & Co.....	13	562	
Temple & Lockwood.....	8	22	
Montgomery & Co.....	5	92	
F. S. Pilditch.....	4	498	
Newton & Shipman.....	3	145	
R. F. Downing & Co.....	2	2,046	
Steel Rods: Dana & Co.....	800	5,681	
Naylor & Co.....	330	18,063	
A. Heyn.....	100	1,612	
J. Abbott & Co.....	100	3,990	
Cary & Moen.....	40	864	
Steel Plate Cuttings: Naylor & Co.....	21	168	
Steel Sheets: Pierson & Co.....	26	1,010	
C. S. Mersick & Co.....	10	137	
Steel Bars: R. H. Wolf & Co.....	10	29	
Steel Tubes: J. S. Leng & Co.....	10	52	
Rivet Rods: J. Abbott & Co.....	201	201	

Sheet Iron: T. B. Coddington & Co.....	59	1,339
Old R. R. Steel: A. Milne & Co.....	112	112
Wire Rods: J. A. Roebling's Sons.....	25	174
Tin Plates.		
	Boxes.	Boxes.
A. A. Thomsen & Co.....	11,355	141,312
Phelps, Dodge & Co.....	10,646	517,767
Dickerson, Van Dusen & Co.....	8,848	257,814
T. B. Coddington & Co.....	8,413	158,918
N. L. Cort & Co.....	7,349	104,452
Bruce & Cook.....	3,410	82,128
Central Stamping Company.....	2,693	34,830
G. B. Morewood & Co.....	2,437	48,162
Pratt Mfr. Co.....	1,821	159,662
R. Crooks & Co.....	1,906	64,916
Hy. Whittemore & Co.....	950	47,426
Wolf & Roebling.....	938	85,896
Merchant & Co.....	937	21,776
E. S. Wheeler & Co.....	774	9,023
Corbiere, Fellows & Co.....	591	7,984
Somers Brothers.....	583	1,351
Lalanc & G. Mfg. Co.....	449	5,182
S. Shepard & Co.....	271	19,029
C. S. Mersick & Co.....	221	6,481
American Screw Company.....	196	196
Metals.		
	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	960,647	11,136,080
Phelps, Dodge & Co.....	392,285	2,684,843
Bidwell & French.....	224,354	401,224
Naylor & Co.....	168,375	3,046,525
Jas. E. Pope, Jr.....	112,127	562,923
A. A. Thomsen & Co.....	44,704	233,697
American Metal Co.....	22,414	3,011,242
Irons and Metals Warehoused from November 10 to November 17, Inclusive:		
		Tons.
Charcoal Iron: A. Milne & Co.....		75
Iron Wire Rods: A. Milne & Co.....		24
Hardware, Machinery, &c.		
Ansonia Brass and Copper Co., Mdee., cs., 6		
Adams, E. W. & Co., Mach'y, cse., 1		
Baldwin Bros. & Co., Gun Barrels, cs., 8		
Baker, Hermann & Co., Mdee., cs., 5; Arms, cs., 26		
Barbour Bros. & Co., Mach'y, pkgs., 24		
Curley, J. & Bro., Mdee., cs., 5		
Clark, Geo. A. & Bros., Mach'y, cs., 1		
Clark Thread Company, Mach'y, cs., 104		
Dudley, W. H. & Co., Mach'y, cse., 1		
Erie Despatch, Mach'y, cs., 19		
Field, Alfred & Co., Arms, cs., 3; Skates, cs., 19		
Folsom, H. & D. Arms Co., Arms, cs., 32		
Foreign Express Co., Railway Material, pkgs., 154		
Furman, H. C., Arms, cs., 3		
Gurney, Fred. B., Mdee., cs., 3		
Hartley & Graham, Arms, cs., 40		
Hansel, Bruckman & Co., Machine parts, cs., 6		
Ismay J. Bruce, Brass Tubes, 1000		
Lau, J. H. & Co., Arms, cs., 18		
Merch. Desp. Company, Arms, cs., 7		
Mosle Bros., Mach'y, bxs., 2		
Niles Tool Works, Mdee., cse., 1		
Pim, Forwood & Co., Chains, 2		
Schoverling, A., Arms, cs., 40		
Schoverling, Daly & Gales, Arms, cs., 7		
Sheldon, G. W. & Co., Cutlery, cse., 1; Mach'y, cse., 1		
Schmidt, Wm., Ironwork, csk., 1		
Taylor, Thos., Mdee., cs., 7		
Van den Toorn, Arms, cs., 13		
Williams & Whitney, Anvils, 11		
Ward, Asline, Mdee., cs., 5		
Wilmerding, Hoguet & Co., Hdw., cs., 25		
Wiebusch & Hilger, Lim., Arms, cs., 7		
Wright, Peter & Co., Arms, cs., 18; Chains, cks., 32; Arms, cs., 2		
Order: Mach'y, cs., 2		
Exports of Metals.		
	Nov. 10 to Nov. 17.	Jan. 1 to Nov. 17.
	Pounds.	Pounds.
Copper: J. Abbott & Co.....	337,500	13,020,030
Lewisohn Bros.....		4,041,522
F. A. Lomal.....		2,581,298
American Metal Company.....	26,429	6,018,291
G. H. Nichols.....		223,989
J. Bruce Ismay.....		112,000
S. Mendel.....		560,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Com- pany.....		224,084
J. Kennedy, Tod & Co.....		112,026
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....		449,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....		1,451,130
Williams & Terhune.....		99,320
J. Parsons & Co.....		430,000
Naylor & Co.....		448,809
Bridgeport Copper Com- pany.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Ladenburg, Thalmann & Co.....		229,371
W. H. Crossman & Bro.....		4,000
R. Crooks & Co.....		1,000
Copper Matte: Williams & Terhune.....	109,685	86,663,429
Lewisohn Bros.....		3,021,610
American Metal Company.....	436,384	4,516,368
J. Abbott & Co.....		337,447
C. Ledoux & Co.....		969,899
F. W. J. Hurst.....		184,228
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		180,996
Kunhardt & Co.....		41,652
Copper Ore: Williams & Ter- hune.....	882,550	882,550
American Screw Company.....	229,695	229,695
Lead: Joseph Gillet.....	664,621	1,137,295
Old Copper: Burgess & Co.....	22,237	661,374

Hardware.

The demand continues in moderate volume, winter and other seasonable goods constituting a good portion of the business. While a confident feeling prevails in the trade and business throughout the country is generally satisfactory, the time of year has been reached when merchants have generally supplied themselves with goods for the trade of the next few months, and orders are in many cases principally for small quantities of Hardware to complete their assortments. Prices remain very steady, and in goods that lie near the raw material there are indications of increasing firmness, especially in the fact that manufacturers are indisposed to accept orders for such goods the execution of which is deferred beyond the first of the year. This is regarded as a favorable symptom, and indicates the probable wisdom of placing orders for such goods, on many of which low prices are now ruling.

Wire Nails.

There is little change in the general situation, quotations on Standard Nails remaining as before. Some of the manufacturers are issuing lists for the goods in papers, in which the list prices are advanced 2 cents per pound, with announcement of a deduction of 1 cent per pound from the list on Nails packed in 25-pound boxes, and of 2 cents per pound on the Nails packed in 100-pound kegs. Other manufacturers retain their lists as before on the basis of 100-pound packages, with advances of 1 and 2 cents, respectively, for 25 and 1 pound packages.

Cut Nails.

The irregularities lately alluded to are less pronounced. They grew largely out of the fact that one or two smaller mills were closing out Nails previous to stopping their manufacture, at least for the present, or to turning to other branches, like the manufacture of Muck Bar, either for the open market or for neighboring mills engaged in other lines. They have led, however, to considerable inquiry for forward delivery, say 60 to 90 days, though so far as we are able to ascertain little business of this kind has been done. We quote \$1.80 to \$1.90 for carload lots and \$1.90 to \$2 for small lots from store.

Miscellaneous Prices.

The Sandpaper market continues unsettled, materially lower prices being quoted than those which prevailed previous to the breaking up of the combination, as announced in last week's issue. The competition between the different manufacturers promises to be animated. As a general price on small quantities, discount 35 to 40 per cent., may be named, with a discount 45 per cent. on 50 reams, and of 50 per cent. on 100 reams.

Mill Roving Cans are now offered as follows by the Union Indurated Fibre Company, of New York, at the following prices:

	Per doz.
10 inches diameter, 36 inches deep...	\$33.00
10 " " 33 " " "	31.00
10 " " 30 " " "	30.00
12 " " 36 " " "	36.00
12 " " 33 " " "	34.00
12 " " 30 " " "	32.00
14 " " 36 " " "	48.00
14 " " 33 " " "	45.00
14 " " 30 " " "	42.00
17 " " 36 " " "	72.00
17 " " 33 " " "	66.00
17 " " 30 " " "	60.00

These are described as light, strong, and having the generally superior characteristics of the ware. They are in use in some of the Eastern mills, and giving excellent satisfaction. They are also described as specially adapted for use as Store Barrels for Pickles, Seed, Flour, and

also for use about restaurants, hotels and home for offal barrels. Covers of the same material are also manufactured.

November 16 the following revised prices of Shot were announced, subject to the usual discount of 2 cents per bag of 25 pounds if paid within five days from receipt of bill:

Drop, per bag, 25 pounds.....	\$1.23
Drop, per bag, 5 pounds.....	.30
Buck and Chilled, per 25-pound bag.....	1.48
Buck and Chilled, per 5-pound bag.....	.35

Notwithstanding this decline in price it is a question whether the market is yet settled, the probability being that there will be another reduction provided Lead does not advance beyond the figures now ruling, as there is more than the usual difference between the raw material and the finished product.

The following is the list of Perfection Padlocks manufactured by the Ames Sword Company, Chicopee, Mass., which are alluded to in their announcement on page 43. The Padlocks, up to No. 150, are subject to a discount of 40 per cent., and No. 150 and upward to a discount of 50 per cent.:

No.	Size, inch.	Kind.	Per doz.
50	¾	Plain Brass Padlocks (Dog Collar), 6 Levers, 2 Keys, Small Shackle.....	\$4.50
50½	¾	Plain Brass Padlocks (Dog Collar), 6 Levers, 2 Keys, Large Shackle.....	4.50
51	¾	Plain Nickel Padlocks (Dog Collar), 6 Levers, 2 Keys, Small Shackle.....	6.00
51½	¾	Plain Nickel Padlocks (Dog Collar), 6 Levers, 2 Keys, Large Shackle.....	6.00
75	¾	Plain Brass Padlocks, 6 Levers, 2 Keys.....	5.00
76	¾	Plain Nickel Padlocks, 6 Levers, 2 Keys.....	6.50
77	¾	Brass Padlocks with Clevis Drop and 31-inch Chain, 6 Levers, 2 Keys.....	9.00
78	¾	Nickel Padlocks with Clevis Drop and 31-inch Chain, 6 Levers, 2 Keys.....	11.00
100	1	Plain Brass Padlocks, 8 Levers, 2 Keys.....	6.00
101	1	Plain Nickel Padlocks, 8 Levers, 2 Keys.....	8.00
102	1	Brass Padlocks with Clevis Drop and 12-inch Chain, 8 Levers, 2 Keys.....	9.00
103	1	Nickel Padlocks with Clevis Drop and 12-inch Chain, 8 Levers, 2 Keys.....	11.00
150	1½	Plain Cast Bronze Padlocks, 8 Levers, 2 Keys.....	11.00
152	1½	Plain Cast Bronze Padlocks with Staple and 10-inch Chain, 8 Levers, 2 Keys.....	12.00
187	1½	Plain Cast Bronze Padlocks, 8 Levers, 2 Keys.....	12.00
188	1½	Plain Cast Bronze Padlocks with Staple and 10-inch Chain, 8 Levers, 2 Keys.....	13.00
225	2¼	Plain Cast Bronze Padlocks, 8 Levers, 2 Keys.....	13.00
226	2¼	Cast Bronze Padlocks with Spring Drop, 8 Levers, 2 Keys.....	14.00
227	2¼	Plain Cast Bronze Padlocks with Staple and 10-inch Chain, 8 Levers, 2 Keys.....	14.00
228	2¼	Cast Bronze Padlocks with Spring Drop, Staple and 10-inch Chain, 8 Levers, 2 Keys.....	15.00
250	2½	Plain Cast Bronze Padlocks, 8 Levers, 2 Keys.....	15.00
252	2½	Plain Cast Bronze Padlocks, Clevis Drop and 10-inch Chain, 8 Levers, 2 Keys.....	16.00

McNiece's Ice Creeper, manufactured by William McNiece, 515 Cherry street, Philadelphia, Pa., is sold at \$15 per gross, subject to a discount of 10 per cent.

The All-Steel Grip Ice Creepers, manufactured by the Penn Lock Works, Philadelphia, for whom W. H. Jacobus & Co., 90 Chambers street, New York, are agents, and illustrated on page 802, are sold at \$3 per dozen pairs, subject to a discount of 33½ per cent.

The James L. Haven Company, Cincinnati, Ohio, call our attention to a typographical error in the statement of their prices given in our issue, 1st inst., in which Ox Shoes were quoted at 5½ cents per pound, instead of 6½ cents, the correct figure.

Items.

C. F. Guyon & Co., 99 Reade street, New York, have been appointed agents for the Niles Mfg Company, Chicago, Ill., and are thus offering the Niles' Double-Acting Spring Hinges. These Hinges are fully described in the circular of the company, which illustrates their special features, attention being called to the advantages possessed by them.

E. C. Atkins & Co., Indianapolis, Ind., have issued a revised edition of their "Saws and Saw Tools." It contains 128 pages of matter revised to date and showing the recent additions to their line. It relates to Circular, Band, Gang, Rip, Cross-Cut and other Saws, Anvils, Straight Edges, Hammers and Saw Tools for saw-makers' use and a full line of Mill Supplies and Saw Mill Specialties. A valuable feature of the book will be found in the full instructions with illustrations in regard to the use and care of Saws, which will be of service to sawyers, filers and those using these goods. They also refer to their branch house in Memphis, Tenn., where they carry a full line of Saws, Saw Tools and Mill Supplies. A copy of this book will be sent on application to any sawyer or lumberman.

The Union Indurated Fibre Company, of New York, are calling the especial attention of their trade at this season to their holiday novelties. In Umbrella Stands or Holders of this material they offer several styles of decoration. Pa-Crusta, Mosaic Inlay (wood effect), hand decorated and plain for home decoration. Waste-Paper Jars or Scrap Baskets, with those same decorations, are also finding a large sale.

On page 42, M. M. Buck & Co., St. Louis, Mo., advertise that they have for sale a very complete and desirable Malleable and Gray Iron Foundry. Those interested are wanted to correspond with the company, and they inform us they are desirous of closing it out at the earliest possible moment.

The Skillman Hardware Mfg. Company, Trenton, N. J., in their descriptive catalogue give prices and descriptions of their extensive line of Mineral, Porcelain, Jet, Bronze Metal and Wood Door Knobs, together with a number of Builders' Hardware specialties. Their exceptionally large variety of Door Knobs will be noticed, as well as other goods. In addition to those represented in the catalogue, they have recently enlarged their assortment by a number of Shutter Knobs, Hook Shutter Bars and Straight Reversible Shutter Bars.

John P. Lovell Arms Company, Boston, Mass., have issued a new catalogue of their Guns, Rifles, Revolvers, Fishing Tackle, Sporting Goods, &c. It is of interest as showing some standard lines with recent novelties. Among these we notice the Springfield Roadster and Bean's Breech-Loading Gun Cane.

Walbridge & Co., Buffalo, N. Y., issue a convenient pamphlet devoted to Sleigh Bells, Snow Shovels, Soapstone Foot-Warmers, Skates, Hand Sleighs, &c. It also calls attention to the Never-Slip Horseshoes.

In addition to the agency for the Sequatchee Hoe and Tool Company, held by H. S. Jackson & Co., Nashville, Tenn., to which we referred in our last issue, they announce also those of the American Tube and Iron Company, Benwood Iron Works, Baldwin Locomotive Works, J. H. Sternbergh & Son, Oliver Bros. & Phillips, Oliver & Roberts Wire Company, W. P. Townsend & Co., and others.

Paine, Diehl & Co., Philadelphia, Pa., announce that they control the sale and manufacture of the Keystone Beaters, and

will offer them to such of the trade as agree to maintain prices. The success of the plan which they have adopted in showing the Egg Beaters in operation is referred to, and a constant and increasing demand is reported.

The R. Wallace & Sons Mfg. Company, Wallingford, Conn., have issued a new and exquisitely printed catalogue of their Sterling Silver-Ware, Nickel Silver-Ware, Fine Table Cutlery, &c. The production this year of a very large number of wholly new patterns is referred to as requiring an entirely new catalogue, and it is evident that many original designs are represented in this volume. The illustrations given being finely engraved and on paper of exceptionally excellent quality, exhibit the goods very satisfactorily. The catalogue is divided into the following departments: Silver-Plated Ware, which represents a large variety of articles, occupying about 50 pages; Sterling Silver-Ware, with illustrations, without prices; Fine Table Cutlery, Cast-Steel Silver Plated, of which a variety of patterns is shown, many of which are new and exceedingly attractive, and Novelties in Steel in cases, representing an interesting line of Nut Picks, Fruit Knives, Coffee Spoons, Button and Glove Hooks, Pocket Fruit Knives, Nut Cracks, &c. A separate catalogue refers to Cast-Steel Spoons, Forks, &c., Silver Plated and also Tinned.

The Porter Mfg. Company, Burlington, Iowa, issue a price list of Porter's Patent Window and Door-Screen Corners, Sticks for Frames, &c., and the Queen City Adjustable Window Screen.

Tendencies in Trade.

We continue below extracts from recent letters from Hardwaremen in which our correspondents more or less fully allude to the present condition of trade as divided between manufacturers and jobbers. It will be seen that in the letters given a considerable divergence of view is expressed, each writer referring to the matter from his own standpoint. It will be observed that many of them allude to the important place occupied by Hardware jobbers as distributors, handling a large proportion of the goods sold and serving greatly the convenience of the retailer. But many of the letters will be of interest as giving our correspondents' views on various matters connected with the trade. There will also be found in them something that will be suggestive to both merchant and manufacturer.

Hannibal, Mo.—I have no specified record of my business, commencing 1853. Always bought as near home as possible to save transportation expenses, prices and quality being equal. To sum up the whole matter, it is this: The retailer can buy cheaper through the jobber than from the factory with the exception of a few staple goods, where a sufficient quantity can be bought to get the extra discount, as Locks, Butts, Screws and some tools. Otherwise I buy of the jobber a general assortment of Hardware for cash cheaper than from the manufacturer, considering expense it must incur on a small quantity, which is the way every prudent retailer should buy if he wants to keep an assortment and make it pay. There is no profit for a merchant to buy \$50 worth of Maydole Hammers, or the same amount of Steel Squares, if he only has sales for about \$10 worth of either in 12 months, when half-a-dozen can be bought whenever needed at, say, 10 per cent. more. He will always have the benefit of ruling market prices. The question for me is, Have Fred P. Straub & Co. confined themselves to a strictly Hardware business—that is, all kinds of Hand Tools, Building Hardware and such articles, made in part of Iron or Steel, for general use, or have they been selling Farm Machinery, Wagons, Buggies, Stoves and Tinware, all under the name of Hardware? If so, they have to buy direct from the manufacturer. On the other hand, they may have increased their business from ordinary retailer to small jobber. Then, of course, they must buy of manufacturer. There is a vast amount of goods made now in the West. Take a line north to south from Michigan to Tennessee, a country 35 years ago not thought about from the manufacturing standpoint.

Every merchant looked to the East to buy goods. Now we see manufacturing establishments almost everywhere. Hence, no doubt the Eastern manufacturer loses some of the Western trade every year, excepting in certain specialties.

Fort Dodge, Iowa.—We think that the tendency among smaller jobbers is to buy more directly from the manufacturer and not depend on larger jobbers as much as in the past. But the retail dealers, almost without an exception, buy from jobbers. This is the case in this territory, and the principal reason is that the retail dealer, as a rule, buys in small quantities and must have his goods at once. This can be accomplished if he buys from a jobber, but if he sent his small orders to a manufacturer he could not get his goods in time to do him any good.

Pueblo, Col.—We are satisfied that there is a decided increase of dealings with manufacturers, owing to solicitations for custom and greater inducements offered by manufacturers to the smaller trade.

Washington, Ind.—With regard to our special trade we think the jobbing portion remains about the same, or nearly so, as previous years. The new Railroad law gives us an advantage in getting goods from Western jobbers that we formerly sent East for, but now the difference in freights about equalizes the difference in cost, so that we don't think our factory orders have increased any appreciable amount.

Randolph, N. Y.—We buy few goods direct from the manufacturers, for this reason: On the amount of our purchases we can do fully as well, and in many cases better, with the jobber as with the manufacturer. We buy the greater portion of our goods West, as we can buy as well and make a nice saving on freights. Probably if our business were doubled we would find it to our advantage to deal with manufacturers. We would prefer to do so, and lean that way as much as possible now.

Peoria, Ill.—The small dealers have almost given up buying from manufacturers, because they have to buy more than they want of many kinds of goods in order to make a shipment, and they prefer to buy in smaller quantities and get goods oftener, even though paying for the privilege. The larger retailers are often of more importance than the jobber, and are so much impressed with that idea as to be willing to pay the manufacturer more for goods than they would have to pay the jobbers, simply to keep up the impression. Our experience is that what we have gained in the small dealers' trade has been lost on the larger trade, leaving the balance about the same.

Fort Smith, Ark.—Years ago St. Louis jobbers had complete control of this city's trade, and in the Southwestern section of this country manufacturers never solicited; neither did the manufacturers' representative call on us for trade direct. In the last four or five years the solicitations of the manufacturers with the small jobbers and large retailers in the Southwest has each year increased largely, the manufacturers offering goods at such prices that the St. Louis jobbers could not or would not meet them. Consequently the large jobbers have been placed between two millstones, and the grinding process is still in operation. The most benefit in this accrued to the small stores, jobbers and retailers. It has built up more small jobbing centers throughout our section who deal direct with the factories or their agents at a consequent loss to the large jobbers, which, for our section, were at St. Louis, Cincinnati, Chicago and, say, Memphis. The manufacturers have very likely gained also thereby, as the small jobber is not so exacting in demanding a ruinous price of the manufacturers as the large jobber. They may sell less in this way, but their profits are larger. Fort Smith, with the exception of one or two retail establishments, buys direct from manufacturers or their agents. She is gradually forcing St. Louis out of the territory surrounding Fort Smith, pursuing her to the limits where it becomes merely a matter of freight rates. Little Rock is fighting both Memphis and St. Louis. Springfield, Mo., tussles with St. Louis and smaller jobbing centers. Hot Springs, Pine Bluff, Ark., are doing the same with the larger jobbers. On the one side we have Fort Smith, and other points in our section increasing their jobbing trade yearly through the aid of the manufacturers, and on the other a yearly decrease in sales and profits to the large jobbers located in large cities.

Davenport, Iowa.—We think the jobbing business is not on the increase, as the large manufacturers are trying to do away with the middlemen by direct offers to the country trade and small manufacturer and by limiting the discounts to the jobbers to such a small percentage as not to pay business expenses. They will fail again in this effort as they did before. Jobbers, on account of the variety of their goods, can reach consumers at less expense than the manufacturers of a few articles.

The past has given to a good many manufacturers a severe lesson, which ought to be in their memory, but the prosperous position of the jobber has created jealousy and another lesson seems to be necessary.

Louisville, Ky.—We believe the jobber has an important place to fill, of which he cannot be deprived. It is a continual case of turn-over—the small houses grow into jobbers and jobbers who have insufficient capital or insufficient brains are displaced. Of course, if it comes to such a pass that a jobber cannot secure sufficient margin, by reason of his supposed advantages, he will simply turn his attention to supplying a smaller class of trade than he does at present. Certainly the rule of *facile descensus* will apply here as well as elsewhere.

Jerseyville, Ill.—I am buying most all my Hardware from the jobbers, principally in St. Louis. Of course there are some goods purchased of manufacturers, but they do not exceed 15 to 20 per cent. of my purchases.

Geneseo, N. Y.—While it is for the interest of the retail dealer to buy certain lines of goods at first hands, we would say that as far as our observation goes the jobber is more than holding his own, for the reason that the variety of goods he, as representative, has makes him more than an even competitor for the manufacturer with only one class of goods to offer, and with this line in many instances in the hands of the jobber at the same price, or a very small advance, thereby making one or more less accounts. The retailer can also by buying more goods of the jobber get better prices for the whole invoice. We think it is with them somewhat as it is with us, that the more a customer buys the better they can afford to use him.

Quincy, Ill.—We think the jobbing business is on the increase in the West. The new jobbing houses in the West, together with the increased number of traveling men sent out by the old houses during the last few years, have made competition so sharp that there is little or no saving for country merchants to buy of manufacturers or their agents.

Brookings, Dak.—In our district, and so far as our observation goes, Irons are bought from manufacturers or their agents, also Tin goods and Scales; Hardware and miscellaneous goods from jobbers.

Searcy, Ark.—Merchants of this place buy most of their Hardware from jobbers, very little being bought from manufacturers.

Morrilton, Ark.—We buy more from manufacturers than formerly.

Doland, Dak.—We are buying two-thirds of our goods from jobbers.

Scotland, Dak.—The merchants West buy most of their goods from jobbers, as manufacturers' representatives do not get as far West as this, unless they want to introduce some novelty. We should say jobbers get the bulk of trade out West.

Paoli, Ind.—I buy principally of the jobbing trade, but buy of the manufacturer in some lines, and am inclining toward the manufacturer. A few years ago I bought of jobbers exclusively.

Highmore, Dak.—Our tendency is toward direct dealings with the manufacturers more and more each year. It is merely a question of price with us, as we do not overstock in order to obtain an extra discount, but can obtain it on our usual purchases from the manufacturers.

Lebanon, Ind.—We are of the opinion that the tendency is to trade direct with the manufacturers. We buy at least two-thirds of our goods direct.

Rapid City, Dak.—If the dealer has business enough, we think it pays to buy of the manufacturer; but, buying in small lots, it is much better to sort up with a jobber. The Hardware merchants of Rapid City buy mostly of jobbers.

Adrian, Mich.—If there is an increased tendency toward direct dealings between the retailer and manufacturer, presume the cause is, prices being equal, the retailer likes to have his goods come to him in fresh packages, and not have some unfamiliar make substituted to fill an order. Also, the "back order" business is a sea of trouble to the retailer.

Ottumwa, Iowa.—Our impression is that there has not been much increase in the jobbing business during the past two years. This, we think, is due generally to depression in the Hardware business and the very small margins of profit made by the jobbers, rather than to a tendency among retailers to buy direct from the manufacturers.

Quincy, Ill.—We as jobbers buy most of our goods direct. In this section small dealers are supplied by the jobbers.

Watertown, Dak.—In this part of the country we are dealing more and more direct with

the manufacturer, and find we can do much better. We buy where we can buy the cheapest, and in almost every instance where we want a good bill in any one line we can do the best from the factory.

Keokuk, Iowa.—Cannot see much change in proportion of business done by jobbers. Retailers buy a few specialties of manufacturers, but the bulk of their goods from jobbers. Think the buying of goods from jobbers is rather on the increase than otherwise, principally on account of the time required to get goods of manufacturers, retailers generally expecting their orders to be filled the same day they are received.

Vinton, Iowa.—We buy most of our goods from manufacturers, not because we can buy goods much cheaper, but for the following reasons: The manufacturers agree to furnish a special make of goods, the jobbers being frequently unable to do this, because they do not carry a full line of the goods wanted; the manufacturers do not usually charge case and cartage, and goods come in better shape.

The following letters are selected from our advices from Ohio, and will be of interest as referring to a number of places, large and small, thus giving a more complete view of the tendencies in that State than is afforded in the more cursory view of the field at large afforded in the letters printed above:

Columbus, Ohio.—The country merchants in all the territory over which our trade extends make all their purchases of Hardware from the jobbers, with perhaps the rare exception of some special article. Goods are sold so close by the jobbers that it is no object to deal with the manufacturer. The Hardware trade has largely increased within a few years past in both wholesale and retail business.

Richmond, Ohio.—In this section of the State goods are largely bought of jobbers.

Bridgeport, Ohio.—I think the tendency of the times is toward dealing with manufacturers.

Granville, Ohio.—We think jobbers' trade is growing every year, and if they only keep good goods at manufacturers' prices the retailers will purchase of them.

Gallipolis, Ohio.—I buy both from the jobber and the manufacturer. In some lines of goods I buy exclusively from manufacturer, while in other lines I buy of jobber and manufacturer, but taking it as a whole I buy the bulk of my goods from manufacturer. I think that this is the case with most houses in this section that amount to anything.

Massillon, Ohio.—We find the tendency (regarding ourselves) toward direct dealings with the manufacturers.

Kenton, Ohio.—We have very little knowledge where the Hardware trade generally throughout our State buy their goods, but judging from what we know as to the stores in this country they buy the bulk of their goods from the jobbers. Of Heavy Hardware, such as Iron, Nails, Barbed wire, Gas-Pipe, &c., the bulk is bought from the manufacturers. We find that, generally speaking, we can do as well with the jobber as with the manufacturer.

Chillicothe, Ohio.—In our trade there is very little change in our buying for the last four years.

Bryan, Ohio.—We find it profitable to deal with the manufacturer direct when we wish to use the quantities of goods that he wishes to sell, but we think that many dealers do as well with jobbers when they are purchasing in small quantities.

Hamilton, Ohio.—We think the tendency is to buy from the factory more and more every year.

Perrysburg, Ohio.—My experience is that jobbers sell fully as low to the retail trade as the manufacturers, except in some special cases, though there are always some who think they are not buying low unless they buy from headquarters. The jobbers are a great convenience to the retail trade, as the retailer can order a large line of goods from one source and save freight that he would be obliged to pay by ordering the same goods from different sources. The jobbers' trade is becoming localized, and goods will be sold in the territory naturally tributary to their location. I think I would pay more for the goods I buy if there were no jobbers, as the lively competition keeps prices down to a small margin. The business is getting to be done by large and wealthy houses. I think they are a necessary part of the business and are here for all time.

Woodville, Ohio.—The practice of most of the wholesale houses doing a very extensive retail business in selling goods to the consumer, and that, too, in the immediate vicinity where they have Hardware dealers for customers, at prices but a little over those charged to dealers,

is not relished by the trade. Further, the pernicious practice of traveling men over-anxious to sell goods, especially in small towns, when failing to sell to the regular trade, proceeding straight to some general store and very often stocking them up with goods that belong to the Hardware trade only, at very low prices, for the purpose of drawing out other trade, of course, is not looked upon with favor by the trade. I would prefer, therefore, to deal directly with the manufacturer rather than a wholesale-retail house, or those who furnish goods to general stores.

Dayton, Ohio.—We are buying as much from the jobbers as we are from the manufacturers. The price decides how we will buy. Our tendency in buying is in the direction of the manufacturers.

Howard, Ohio.—I buy all goods from jobbers.

Portsmouth, Ohio.—It seems to us that Hardware dealers are disposed to buy direct from the manufacturers, or their agents, and the only way the jobbers can prevent it is by giving away a part of the extra quantity discounts allowed them by the manufacturers.

Ironton, Ohio.—We can safely say that we are buying as many goods of jobbers as we did ten years ago, and think that we will do so as long as we are small dealers. We know by experience that there is no money saved by buying small lots of factories direct. We think, and, in fact, know, that when we give an order for \$500 worth of Hardware there are goods in this order made by 25 different factories. Should we order the goods direct from factories there would be 25 orders to send, 25 lots of freight to receive, 25 freight bills to pay, 25 drayages to pay, 25 entries to make in books, and some of the goods come in two or three weeks late. Besides, not one of the manufacturers would thank us for such a small order and the price is about the same as the jobber would gladly give us. We think that as long as we can count ourselves retailers we will buy more of our goods from jobbing-houses, as the Hardware store has probably the greatest variety of goods of any other class of stores in the country. We think that as long as there are small Hardware stores there will be jobbers also. We are of the belief that this matter will remain in the future as it has been in the past, that the great part of General Hardware will be bought of the jobber.

Washington C. H., Ohio.—We think tendency is to have direct dealings with manufacturer or his agent.

Apple Creek, Ohio.—I find that the large retailers in this section are buying more of the jobbers than manufacturers, and that the jobbing trade in our State is on the increase. We have Cleveland, Youngstown, Akron, Canton, Toledo, Mansfield and Dayton with large jobbing houses, with stocks ranging from \$75,000 to upward of \$300,000, while a few years ago Youngstown, Akron, Canton, Mansfield and other places contained only retail stores. In most instances we can buy cheaper of the jobber than the manufacturer. The jobbing trade is on the increase.

Pomeroy, Ohio.—We buy the greater part of our goods from jobbers and manufacturers' agents—Iron, Nails, Horseshoes, &c., from manufacturers.

Toledo, Ohio.—Our dealings with jobbers and manufacturers for the past year, as nearly as we can find out, have been about equally divided, and we are buying more from the manufacturers now than formerly.

Business Methods.

Kellogg, Johnson & Bliss, 108 and 110 Randolph street, Chicago, have a system of preserving copies of orders which they claim is far more satisfactory than any other plan they have tried. For this purpose they have taken a blank book of 400 pages, with the pages numbered and an alphabetical index in front. As most of their goods are bought regularly from certain houses, they assign a number of pages to each house, according to the volume of business which they have been in the habit of transacting in that line. Plenty of room is left for houses from whom purchases are made irregularly. In this book all orders are copied before they are mailed, and in it also the goods are checked off when they are received. The orders sent to each house are thus kept together. The objection to the use of an ordinary copying book is that the orders are necessarily intermingled, and besides it often happens that through carelessness or haste on the part of the person copying the letter an undecipherable page

is left, which may perhaps relate to the most important part of an order. An occasional error, it is true, may be made in transcribing orders in the method followed by Kellogg, Johnson & Bliss, but in a long series of years they have had very little trouble from this cause, whereas they formerly suffered much inconvenience when using the ordinary copying book. The same firm also use an invoice book for their stock. This is a book of 500 pages. In it all stock is entered in alphabetical order, the names of articles having under them descriptions of every variety carried and their price. This stock book is found of daily value to salesmen, and it is also of very great use in taking account of stock. Kellogg, Johnson & Bliss have one of the largest and best equipped retail stores in the country, and, while they handle a general line of Hardware, they give special attention to Builders' Hardware and Mechanics' Tools.

Arrangement of Stores.

A dealer in Montgomery City, Mo., favors us with a description of a wire-cloth rack, which, in his opinion, is the best for the purpose which has ever come under his notice. He says:

I believe I have a better wire-cloth rack than any I have ever seen, and at very small expense. A fair idea of the device may be gained from the sketch. Each end of the rack is made of a 2 x 6 inch dressed pine board, and the two are joined together at the bottom with a

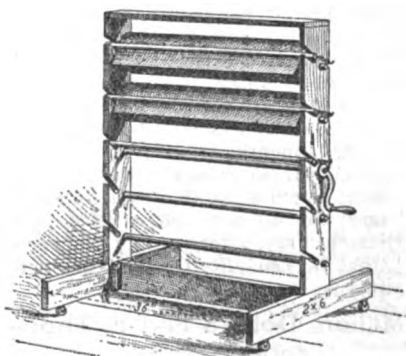


Fig. 301.—Wire-Cloth Rack.

2 x 6 inch piece, making the frame 36 inches wide and providing room for five sizes of cloth. These are slipped on Judd's pine curtain rollers and inserted through holes in each end of the frame, as indicated in the engraving presented herewith. One end of this roller is squared to fit an ordinary grindstone crank. The other end has a gain cut all around it, something after the style of a key seat, except it is crosswise the roller. A piece of No. 8 wire is slipped through the uprights and the edge of the hole into the gain, to keep this rod from working out while unwinding the cloth. In the upright post is cut a series of slots, in which I place rollers of the same description as those above referred to. Into each end of these rollers is screwed a round head blued screw, while a square screw hook is placed in the post just behind the roller holding the wire. To this blued screw I attach a coil brass spring, the opposite end of which I place over the square screw hook above mentioned. The roller and springs give sufficient tension to hold the wire taut while the cloth is being unwound. A rack of this description can be made for \$1.25 which will hold six rolls of wire cloth. I have many other conveniences in use in my store which I may find time to write about later.

Short vs. Long Discount.

While the cash discounts mentioned in the following article from the *American Storekeeper* are larger than those usually given in Hardware, the principle embraced is still applicable, and the matter deserves the careful attention of Hardwaremen:

We will suppose you have purchased a bill of \$1000 and have received the invoice, on which the terms are given as "6 off 10 days; 5 off 30 days; 4 off 60 days." We will first remember that discount is an allowance made for the payment of money before it is due, and is equivalent to the interest of the amount of the invoice, \$1000 in this case, during the 60 days. To apply our mathematics to the case in point, if we pay this bill within 10 days we will deduct \$60 from the invoice and remit \$940. What we have saved equals the interest on \$1000 for one year at 6 per cent. The advantage of doing this is very apparent. If we say we will wait 20 days and take off 5 per cent., we had better think a moment and then not do it. If we should do so, we would pay \$10 for the use of \$1000 for 20 days; this is at the rate of $1\frac{1}{4}$ per cent. per month, or 18 per cent. per annum. You will at once recognize that no merchant should pay such an exorbitant rate of interest, except in time of great emergency. Let us figure a little further and take it for granted that we do not propose to pay the bill until 60 days have expired, and that we then propose to pay \$960. If we do this, we pay \$20 for the use of the money for 50 days. A little calculation will show you that this is equivalent to paying about $1\frac{2}{3}$ per cent. interest per month, or $14\frac{2}{3}$ per cent. per annum. If, now, you do not propose to pay at the end of 60 days, and prefer to pay at 3 months, and pay the \$1000 net, you will be paying \$60 for the use of \$1000 for 80 days, which is at the rate of $2\frac{1}{3}$ per cent. a month, or about 27 per cent. per annum. If the figures in the previous cases were astonishing, these are astounding, and we do not believe that any merchant can say, after reading this carefully, that he can afford not to discount his bills.

A Million Dollars and a Thousand Years.

BY KNARF.

These terms, "a million dollars and a thousand years," are only comparative terms, to designate untold wealth and unlimited life. If I had these at my disposal, they should both be devoted to rectifying some of the most glaring evils of our modern business life—if I felt as I do now. My feelings on the first evil I would tackle may be somewhat wrought up, but I do not think unduly so. It goes by the name of "credit," or words which translate into that, the world over. It is not a large word, and the first letter is near the initial one of the alphabet; but it is a word that brings disaster to the world.

The origin of credit is not certainly known, but is supposed to have come into use when Cain went to dwell in the land of Nod; wanting to trade with his brother-in-law one day, and finding he had put on his other pants before leaving home and left his pocketbook in them, asked his kinsman "to put it on the slate." The same person has left other legacies to the world, which have become equally unpopular. Credit may be one of the evils that must be endured, especially in the nineteenth century. But, from the sewing woman who gets a pound of butter from the corner grocery on tick, until she gets her money on the present unfinished job, to the speculator who buys an elevator full of wheat on futures, the system is the same.

Do the profits to the wholesale Hardware jobber justify the risks he takes in lending his goods around the country—of having

them lent by his traveling representatives?

If he were the only house that sold Mr. Gimlet a bill during the month, the risk would be small. But Mr. Gimlet has the pleasure of entertaining on an average three traveling men each day, who are dependent upon their position the following year in proportion to the amount of their sales this year; consequently they are more than desirous of taking his order for present shipment, and of duplicating the amount of goods in 60 days to fill up his broken assortment. In fact, each of these 18 drummers each week makes all known inducements to book Mr. Gimlet's orders, and our friend Mr. Gimlet, being a shrewd buyer, leaves the house little margin in profits after the \$8 or \$10 a day for salary, traveling expenses and the additional expenses of the house are deducted. The jobber writes a sharp letter, inquiring why the screws and strap-hinge price had been cut so on Mr. Gimlet's bill, with the usual statement that at regular prices the house is making no money. The answer comes back that prices on the road and prices in the office are two different things, and if the salesman sells goods he must meet competition, and then the matter drops. The salesman's answer answers itself. Mr. Gimlet has been buying somewhat more largely of everything than usual, for the crop outlook is good, and, though it is Presidential year, the prospects for a spring trade are good. But the wheat gets frozen out in his section of country by winter rains which melt their snow covering; oats turn out poorly, followed by a large crop of potato bugs, and dry weather, which uses up the berry crop. Legislation in Congress affects the price of raw material; iron drops, and his two carloads of nails have to be sold at an actual loss.

These depressing influences coupled with campaign uncertainties deter the moneyed men from investing in new buildings, the manufacturers from enlarging or improving their plants—in short, the wheels of commerce miss the lubricating causes that insure quiet, easy running, and by the time Mr. Gimlet's bill begins to mature he finds it necessary to ask an extension, giving his paper for the same. His credit has always been good; he has done a safe conservative business; his creditors do not want to close him up, as he may yet be a good customer; Dun and Bradstreet have always quoted him "fair," and a special report from the agency assures them that his embarrassment is only temporary. Matters in Mr. Gimlet's establishment do not improve with time, and as he considers that his family has claims upon him greater than jobbers, who have taken the risks, and made money from him for years, he arranges his worldly affairs so a confidential friend becomes owner of his stock just previous to his notes maturing.

If Mr. Gimlet could have disposed of what goods he did sell for cash, the fraudulent assignment would have been avoided. When he saw the way things were going he sold more freely on credit than he had before, hoping to realize from his book accounts in time to meet his paper. Failure on the part of his customers to fulfill their promises in time to avoid disaster took away his only and last hope. The history of the two or three hundred reported failures a week would read much the same as this, with the word credit, with a big C, at both ends of the novel.

The newly married couple want to buy a stove and the necessary trimming to conduct the culinary department of their newly found paradise. They have so many other things to buy, they can't pay all cash for the outfit, but would like to pay \$5 a month. Mr. Gausedoor sometimes sells stoves on the installment plan, and as he has a form of lease that covers

everything but the souls of his patrons he does not hesitate to let the strangers have what they want on time, making it necessary for seven months to elapse before the bill is paid. Mr. Gausedoor has had to pay for his trimming in 60 days or less, and for his stove in four months. He has made \$4.85 on the deal, and waits six months for his profit, unless he counts his profit before he receives all the cost of his goods. Either the husband or wife make the payments promptly each month, for four or five months, and then they fail to put in an appearance. A visit to their home reveals the fact that the wife is poorly, not being used to hard work, and the husband has been laid off, or is sick, or some good reason why they are not able to meet their payment.

If Mr. Gausedoor's bill was the only one, and all their household plunder but the stove and trimmings were paid for, it would not have been so hopeless; but upon investigation Mr. Gausedoor finds they have signed leases for their furniture and sewing machine. The wife had always been used to a musical instrument in the house, so they thought by a little more economy they could pay \$5 a month on an organ. Their house rent was \$5 a month. They had agreed to pay this \$25 a month on \$1.50 a day that the husband earned, leaving them \$14 a month for their living expenses. Mr. Gausedoor sees the case is almost hopeless, and pulls his stove and trimmings. The other dealers follow suit, and the married couple lose the \$100 or \$125 they have paid. Here is another failure, which is never reported in commercial circles, but causes more suffering and loss of faith in God and man than Mr. Gimlet's did. If this young couple knew they could not get goods on credit the wedding would have probably been deferred until they had enough capital earned to start them on a cash basis. This is not simply a supposed case, but repeats itself over and over in reality each year. Both the merchant and purchaser are injured by credit.

The statement has been made that there is not enough money in the world to pay all the debts at once. This may be the case, but \$1 kept moving will pay the entire indebtedness of the world. But it has got to get a move on it, and keep it up. What a feeling of independent manhood must be the possession of the retail merchant who lives up to the conspicuous notice hung in his store, "Terms Cash!" He can refuse one credit without fear of offending, because he refuses all credit.

What a disagreeable feeling when you see old Judge Pennyman coming into your store. He is soaked with whisky, and you are perfectly sure your shoe bill will encroach upon the principle invested in the goods you sell him, to say nothing of the profits. But you hate to refuse the old resident a little credit, so you sell him a pocket knife for just a few days, and after he has left the store you intentionally forget to charge it, as ever getting the pay is so doubtful.

We are apt to copy as well as admire methods which bring success. The largest as well as the most successful corporations are conducted on the cash system. We admire the stability of Government buildings, and anything in the construction line put up by Uncle Sam we are sure will be well put up. But the money is always ready to pay for it. If the credit system were desirable why should not the railroads sell tickets on time, waiting for the traveler to reach his journey's end and receive the money, the getting of which was the object of his journey, and then pay for the ride? Why do not the telegraph companies send messages and wait for pay until some other time? Why, if these corporations can't get along and do business successfully on anything but a cash basis, can we expect to? The

proportion of those who are successful in business is put down as one-tenth of those who start a business for themselves. There may be reasons why they are not successful, such as temperament, habits, location, ability, &c., &c., but credit is at the bottom of it all.

The affect of the ability of one to have "good credit" is bad. A fact needing no proving is that persons will always buy more freely when having things charged than when paying as they go. Also when the bills come to be paid almost always they are larger than they expected. Would it not be a good plan to look at this method of credit from a higher standpoint? Not that it is a favor you are conferring upon the merchant in taking his goods in exchange for a spoken or implied contract to pay some time, and look at it as if you were asking the loan of money from the merchant. Let the merchant sell his goods and get the money for them, and let the banks sell the credits. And, Mr. Merchant, how many of your customers would you loan money to, even to the cost of the goods they buy and take away home. In a general store in the lumber regions of Michigan we have an example of my theory. When customers want goods on time or credit they are referred to the merchant; he finds how much they want and for how long a time. He then makes out a note for the amount, with interest from date, and, after their signing it, he gives them the money and they pay cash for what they buy.

The money is given them and they pay it to the salesman in exchange for the goods. The credit system is often the result of competition and the desire to make sales, either from actual need of money to pay bills coming due or to gain custom. Time is an almost irresistible inducement to purchasers, and, in buying, they so far overdo the matter that they soon become reckless as to results. A practical solution of the credit system would be a national exemption law, exempting everything a person owns or could own, so no debt could be collected by law. Confidence in men's honesty, not backed by law, would be so much less that credit would be a thing of the past. Without vouching for the truth of the following statement, it has been said that in Japan—I think—any one who owes any one on their New Year's Day is prohibited by the Government from continuing in business until such debts are paid. His business place is closed.

Exports.

PER SHIP MINISTER OF MARINE, OCTOBER 25, FOR MELBOURNE, AUSTRALIA, CONTINUED.

By *R. W. Forbes & Son*.—40 dozen Shovels, 125 dozen Washboards, 4 dozen Egg Beaters, 15 crates Churns, 5 packages Hardware, 1 package Hardware, 11 packages Hardware, 108 dozen Axe Handles, 43 dozen Shovels, 18 dozen Axes, 24 dozen Axes, 2 dozen Bench Screws, 8 dozen Curry Combs, 2 packages Carriage Hardware, 20 dozen Sluice Forks, 4 packages Agricultural Implements, 6 Parers, 16 cases Hardware, 7 Bird Cages, 8 boxes Stoves, 1 dozen Cork Pullers, 1 dozen Carpet Sweepers, 1 case Toys, 1/2 dozen Razor Strops, 2 packages Fruit Evaporators, 28 packages Hardware, 14 dozen Axes, 15 1/2 dozen Hatchets, 2 dozen Bench Screws, 1 dozen Money Drawers, 1 case Hardware, 1140 boxes Clothes Pins, 1 package Farming Machine, 28 packages Hardware, 6 dozen Wringers, 1 case Bench Screws, 80 dozen Shovels, 362 dozen Handles, 6 dozen Horse Brushes, 9 crates Churns, 22,435 pounds Barb Wire, 2 packages Hardware, 2 cases Scales.

By *Arnold, Cheney & Co.*—360 dozen Handles, 960 dozen Handles, 1080 dozen Handles, 3 cases Hardware, 1 case Axes, 8 cases Saws, 800 dozen Handles, 700 dozen Handles, 4 cases Axes, 54,814 pieces Roofing Slate, 4 cases Hardware, 1 case Hardware.

By *New Haven Clock Company*.—1740 Clocks.

By *H. S. Chipman*.—12 cases Step-Ladders.

By *J. H. Startin*.—3395 pounds Iron Rakes.

By *A. Field & Co.*—50 sets Axes.

By *Russell & Erwin Mfg. Company*.—42 cases Hardware, 51 cases Hardware.

By *Plumb, Burdick & Barnard*.—3330 pounds Iron Bolts, 5665 pounds Iron Bolts, 8468 pounds Iron Bolts.

By *Healy & Earl*.—1 box Hardware, 1 case Saws.

By *Welsh & Lea*.—7 cases Iron Bolts, 30 packages Hardware.

By *Ansonia Clock Company*.—112 boxes Clocks.

By *W. K. Freeman*.—300 dozen Axe Handles, 23 packages Lamp Goods, 3 boxes Hardware, 1 package Drills, 12 packages Hardware.

By *Woodhouse & Stertz*.—3244 pounds Axes, 9 cases Hardware.

By *W. Peabody & Co.*—22 cases Woodworking Machinery.

By *Arkell & Douglas*.—104 dozen Hatchets, 50 dozen Axes, 20 dozen Forks, 41 dozen Axes, 70 dozen Axes, 400 pounds Nails, 105 dozen Saws, 18 dozen Hatchets, 2 bundles Hardware, 229 pounds Lampware, 36 sets Axes, 4 cases Hardware, 1 case Carriage-Ware, 2 dozen Saw Clamps, 12 dozen Pulleys, 199 pounds Castings, 6 dozen Mattocks, 6 dozen Picks, 2 cases Wrenches, 1 1/2 dozen Wringers, 16 dozen Shovels, 16 dozen Axes, 500 Broom Handles, 3 dozen Mattocks, 1/2 gross Axe Grease, 1/2 dozen Machinery, 259 pounds Hardware, 18 dozen Glue, 7 1/2 dozen Chisels, 7 packages Stone, 160 1/2 dozen Chisels.

By *J. Dixon Crucible Company*.—671 pounds Lead Pencils.

By *McLean Bros. & Rigg*.—12 dozen Saws, 14 dozen Braces, 1900 pounds Nails, 15 dozen Bench Screws and Wrenches, 10 dozen Clamps, 10,000 Bolts, 351 pounds Oil Stoves, 13 dozen Axes and Hatchets, 8 dozen Axes, 1 dozen Plated-Ware, 13 Coffee Mills, 39 Meat Choppers, 36 dozen Hammers, 1 dozen Store Trucks, 6 gross Mouse Traps, 18 sets Wheels, 2 dozen Miter Boxes, 51 Chucks, 46 dozen Saws, 3 Chucks, 43 dozen Locks, 49 dozen Mouse Traps, 1 case Wrenches and Bell Studs, 3 gross Tin Oilers, 21 dozen Washboards, 12 dozen Lamp Burners, 204 dozen Chimneys, 6 packages Plated-Ware, 3 gross Fly Traps, 40 dozen Illuminators, 1 dozen Firearms, 50 sets Axes, 7 dozen Wringers, 9 cases Drills, &c., 24 dozen Washboards, 48 dozen Axes, 20 Harrows, 28 dozen Drills, 30 dozen Axe Grease, 12 1/2 gross Axe Grease, 45 Weeders, 60 dozen Axes.

PER BARK V. L. STAFFORD, NOVEMBER 1, FOR PORT NATAL, AFRICA.

By *Arkell & Douglas*.—6 cases Agricultural Implements, 2 dozen Meat Cutters, 1 dozen Axes, 3 dozen Washboards, 2 dozen Picks, 30 dozen Picks, 3 Ranges, 10 cases Plow Parts, 62 dozen Brooms, 208 Agricultural Implements, 60 dozen Axes, 5 cases Bolts, 6 Carriages, 10 cases Plow Parts, 208 Agricultural Implements, 3 dozen Wire Goods, 4 dozen Hatchets, 20 dozen Axes, 6 dozen Axes, 40 Plows, 30 dozen Handles, 3 dozen Wheelbarrows, 1/2 dozen Agricultural Implements, 2 dozen Saws, 22 dozen Plated-Ware, 4 dozen Hardware, 12 pairs Sash Pulleys, 1-6 dozen Presses, 80 dozen Hatchets, 2 dozen Sewing Machines, 88 dozen Picks, 1/2 dozen Store Trucks, 150 Plow Beams, 150 pairs Handles, 150 Plow Parts, 5 dozen Axes, 6 dozen Picks, 12 crates Stoves, 1 Carriage, 3 sets Axes, 182 dozen Handles, 39 cases Sash Weights, 4 dozen Braces, 14 1/2 dozen Saws, 6 dozen Hammers, 2 dozen Mandrels, 6 dozen Locks, 54 dozen Axes and Picks, 129 pounds Sash Cord, 1 dozen Agricultural Implements, 152 Plows, 3 dozen Fruit Jars, 180 feet Sash Cord, 75 pounds Horse Nails, 84 dozen Shovels, 9 cases Hardware, 19 1/2 dozen Lampware, 6 dozen Axes, 1 case Hardware, 8 cases Meat Cutters, 5 dozen Wrenches, 2 dozen Handles, 1 case Hardware, 8 dozen Drills, 1-6 dozen Trucks, 9 pairs Hinges, 9 dozen Locks, 1 case Castings, 4 cases Hardware.

By *Marcial & Co.*—10 dozen Axes, 10 dozen Hatchets, 6 dozen Hatchets.

By *H. W. Peabody & Co.*—1 case Hardware.

By *H. A. Caesar & Co.*—25 dozen Axes, 48 pieces Plows, 125 dozen Plow Points, 125 dozen Plow Parts, 32 dozen Plows, 150 dozen Plow Parts, 3/4 dozen Axes and Hatchets, 40 pieces Plows, 72 dozen Plow Frames, 904 pieces Plow Parts, 24 pieces Plows.

PER BARK H. S. JACKSON, NOVEMBER 1, FOR EAST LONDON.

By *W. H. Crossman & Bro.*—2500 pounds Sash Weights, 102 1/2 pounds Sash Cord, 90 dozen Hatchets, 9 Scales, 32 dozen Chains, 10 Stoves, 125 dozen Brooms, 100 dozen Handles, 395 cases Plow Parts, 20 Corn Shellers, 13 Mills, 45 Churns, 6 dozen Clocks, 2000 pounds Nails, 18 packages Carriage-Ware, 4 cases Carriage Hardware, 1820 pounds Sash Weights, 78 pounds Sash Cord, 24 dozen Handles, 20 dozen Hatchets, 40 dozen Brooms, 42 dozen Washboards, 18 Stoves, 221 cases Plow Parts, 2300 pounds Nails, 3 dozen Clocks, 36 Grindstones, 3 packages Carriage-Ware, 14 packages Hardware.

TO MOSSEL BAY.

48 cases Plow Parts, 15 dozen Brooms, 6 1/2 gross Axe Grease, 11 dozen Axes, 8 dozen Hatchets, 1 gross Blacking, 840 pounds Sash Weights, 32 pounds Sash Cord, 42 dozen Handles, 900 pounds Sash Weights, 47 1/2 pounds Sash Cord, 1 box Hardware, 1/2 dozen Corn Shellers, 6 dozen Fly Traps, 119 cases Plow Parts, 24 barrels Carriage-Ware, 1050 pounds Sash Weights, 46 pounds Sash Cord, 1 barrel Hardware, 9 dozen Hatchets, 13 dozen Axes, 24 dozen Handles, 1 dozen Fly Pans, 6 dozen Fly Traps, 20 dozen Brooms, 300 dozen Axe Grease, 110 cases Plow Parts, 1200 pounds Nails, 6 cases Carriage Hardware, 10 packages Carriage-Ware.

PER BARK SIMON, OCTOBER 31, 1888, FOR AUCKLAND, NEW ZEALAND.

By *R. W. Forbes & Son*.—3 gross Shade Rollers, 8 cases Oil Stoves, 9 racks Churns, 9 cases Wringers, 100 dozen Axe Handles, 455 pounds Bolts, 3 boxes Lampware, 4 dozen Wringers, 1 case Lawn Pumps, 1 package Hardware, 10 dozen Shovels, 105 dozen Axes, 7 dozen Forks, 30 dozen Shovels, 8 boxes Scales, 20 dozen Hatchets, 16 dozen Hammers, 4800 Carriage Bolts, 30 dozen Washboards, 60 dozen Axe Handles, 2 packages Carriage Hardware, 11 crates Stoves, 1267 feet Belting, 1 barrel Hardware, 2 boxes Rat Traps.

By *W. H. Crossman & Bro.*—1 case Toys, 10 cases Sates, 100 gross Pistol Caps, 4 packages Lamp Goods, 60 dozen Handles, 12 dozen Axes, 180 dozen Handles, 75 dozen Brooms, 1 dozen Hay Knives, 1/2 dozen Bolt Cutters, 1 dozen Stove Trucks, 3 3/4 dozen Wringers, 1000 pounds Horse Nails, 1 dozen Ox Bows, 12 dozen Mouse Traps, 2000 pounds Nails, 3 dozen Razor Strops and Hardware, 11 cases Hardware, 5 cases Tools, 1 case Hardware, 382 Wood Spoons.

By *H. W. Peabody & Co.*—308 dozen Handles, 30 dozen Shovels, 1450 pounds Nails, 4 packages Clocks, 3 packages Lawn Mowers, 3 crates Sewing Machines, 300 pounds Nails, 7 packages Fire Arms, 2 packages Tools, 6 cases Blacking.

By *Mailler & Duereau*.—372 dozen Handles, 60 dozen Handles, 72 dozen Handles, 180 dozen Handles, 50 dozen Washboards.

By *Welch & Lea*.—2 cases Iron Bolts.

By *Healy & Earl*.—4 crates Forges.

By *Gowlds Mfg. Company*.—3418 pounds Pumps.

FOR WELLINGTON.

By *Mailler & Duereau*.—5 boxes Castings.

By *R. W. Forbes & Son*.—5 packages Hardware, 4 packages Kitchen Utensils, 9 dozen Wringers, 2 cases Stoves, 10 Axes, 2 packages Plated-Ware, 262 dozen Handles, 10 racks Churns, 60 dozen Brooms, 40 dozen Shovels, 25 dozen Axes, 25 packages Hardware, 2 packages Kitchen Ware, 24 cases Handles, 8 crates Churns, 1 case Agricultural Implements, 2 1/2 dozen Wringers, 16 dozen Hatchets, 33 packages Hardware, 60 dozen Shovels, 30 dozen Sash Cord, 6 cases Scales, 2 gross Axe Grease, 2 1/2 dozen Wringers, 2 cases Carriage Hardware, 2 packages Store Trucks, 19 cases Choppers, 1 1/2 dozen Emery-Wheels, 390 dozen Axe Handles, 1 package Hardware, 3 packages Hardware, 2 crates Stoves, 2 dozen Wringers, 12 dozen Handles, 6 dozen Mattocks, 1 crate Agricultural Implements, 40 boxes Horse Nails, 10 dozen Hammers, 10 dozen Shovels, 2 sets Harness, 1 dozen Whip Sockets, 9 sets Axes, 9 packages Hardware, 20 dozen Shovels, 78 cases Horse Nails, 50 dozen Shovels.

By *W. H. Crossman & Bro.*—1120 pounds Axe Grease, 10 dozen Sluice Forks, 130 pounds Sash Cord, 36 dozen Shovels, 1 case Stove Fittings, 9 Store Trucks, 13 1/2 dozen Wrenches, 1-6 dozen Stoves, 6 gross Pencils, 3 cases Plow Parts, 6 dozen Hatchets, 6 1/2 dozen Churns, 1/2 dozen Scales, 1 case Hardware, 2 dozen Pruning Shears, 2 cases Lamp Goods, 12 cases Tools.

By *McLean Bros. & Rigg*.—2 dozen Shears, 6 dozen Hammers, 1 dozen Handles, 1-6 dozen Scales, 1/2 gross Egg Beaters, 18 Clocks, 1 case Plated-Ware, 1 1/2 dozen Augers, 8 1/2 dozen Chimneys, 1 dozen Stoves, 2200 Bolts, 11 Churns, 4 cases Fruit Jars, 1 Stove, 8 dozen Wrenches, &c., 6 dozen Cranks and Rollers, 250 Handles.

By *H. W. Peabody & Co.*—23 cases Handles, 16 packages Hardware, 2 dozen Wringers, 4100 pounds Nails, 52 dozen Shovels, 13 packages Hardware, 500 feet Cordage, 51 packages Carriage-Ware, 98 packages Hardware, 3000 pounds Nails, 20 packages Stoves, 1 case Agricultural Implements, 40 dozen Shovels, 6 crates Churns, 172 dozen Handles, 4 packages Pumps, 1 case Razors, 5 dozen Wringers, 26 cases Hardware, 12 packages Carriage-Ware, 1 case Wringers, 1 crate Stoves, 48 dozen Handles, 210 pounds Nails, 865 pounds Bolts, 2 cases Machinery, 54 dozen Handles, 3 barrels Hardware, 1 case Twine, 103 packages Hardware, 5 packages Pumps, 6 cases Hardware.

The Boss Two-Speed Boring Machine.

This machine, which is represented in Figs. 1 and 2, is put on the market by J. H. Osborne & Co., Union City, Ind. Its special feature is indicated in its name, and consists in the fact that it can be run

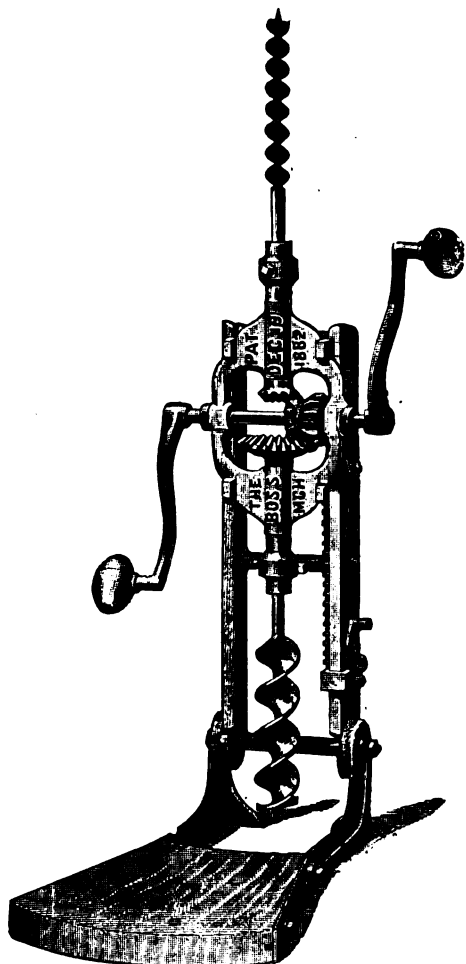


Fig. 1.—The Boss Two-Speed Boring Machine.

at two different speeds, a comparatively slow speed for large augers and a speed two and a half times as great for small augers. The manner in which this is accomplished is indicated in Fig. 1, which shows clearly the mechanism of the ma-

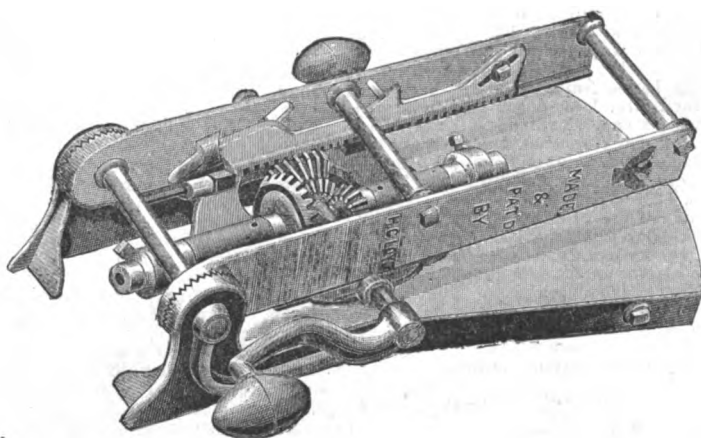


Fig. 2.—The Boss Two-Speed Boring Machine, Folded.

chine. Two augers may, if desired, be kept in the machine, to use either of which it is only necessary to point it downward by first raising the gear frame out of the main frame, inverting and replacing it, keeping the cog gearing on the right-hand side of the machine. It will be observed that the machine will bore at any angle, and that it may be folded up com-

pactly, as shown in Fig. 2. The advantage that results from having a different speed suited to the size of the auger bit used will be appreciated, and it is placed on the market by the manufacturers in confidence that it will be found to meet the wants of the trade. The quality of the workmanship is also alluded to, and various improvements which have been incorporated in the machine. The point is also made that there are no springs or shifting gear to get out of order.

The Standard Calf Weaner.

The accompanying illustrations are descriptive of a new calf weaner which has been brought out by the Standard Wire



The Standard Calf Weaner.

and Iron Works, of Chicago. It consists of a perforated metallic concave plate which fits over the calf's nose and mouth, and is kept in place by suitable straps and a hinged metal frame. In front of the plate and on the sides of the frame are metallic points intended to slightly prick the cow, but which are too blunt to hurt her. The frame to which the plate is attached is hinged at a suitable distance up the calf's jaw to get out of its way when it lowers its head to feed, and to drop back over its mouth when it raises its head to suck. The plate does not closely cover the calf's mouth and nose and interfere with its breathing, but is at least 2 inches from them. The construction of this weaner obviates the fault found with open muzzles, which are apt to catch in brush or limbs of trees, and be broken by the calf in endeavoring to free itself. Bennett

Improved Soldering Furnace.

M. L. Hull, of Cleveland, Ohio, is offering the trade an improved soldering furnace which has been devised to meet the special requirements of tinner, roofers, metal pattern-makers and others who are called upon to perform work in which soldering is required. The furnace uses gasoline as a fuel. By means of the illustration, the reader will be able to gather a very clear idea of the general appearance and construction of the device referred to. The arch, under which the soldering irons



are placed, is made of fire-clay, similar to that employed for fire-pot linings in heating stoves. In order to strengthen this arch as well as to prolong its life, it is covered with Russia iron. The burner employed is of simple construction, being entirely closed in from drafts, rendering it specially desirable for outdoor work.



Improved Soldering Furnace.

The wooden hand-wheel, shown at the right in the engraving, is so arranged, the manufacturer claims, that it never becomes sufficiently hot to burn the hand. The cut-off or switch cup is rapid in operation, and is said to be entirely satisfactory in every particular. The pneumatic rubber pump handle, which has been recently patented, is shown at the base of the furnace, and it only requires a slight pressure of the hand to supply the necessary air to the gasoline tank. The form of handle shown has been found to be much more convenient and durable than the rubber bulb formerly employed. The tank is strongly made in one piece, stamped from metal. The manufacturer states that soon after the fire is started, the arch above referred to becomes red hot on the inside, after which time a very small fire will be sufficient to keep the irons in condition for use. The entire furnace weighs only 12 pounds, and exclusive of the iron arch, only 10 pounds.

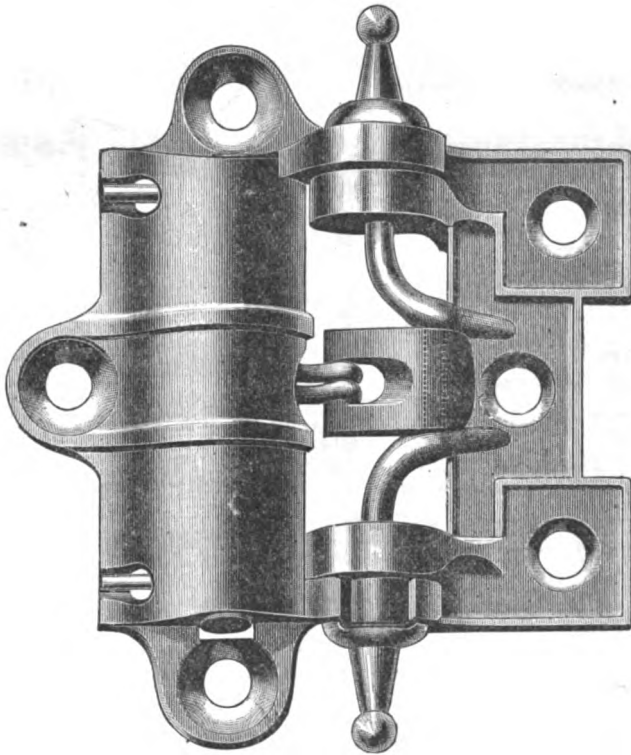
& Shirk, 154 Lake street, Chicago, are sole selling agents.

The Vulcan Iron Works, 86 North Clinton street, Chicago, have recently added a brass foundry to their establishment, and are now prepared to make aluminium bronze castings, for which there is a large field.

New Idea Spring Hinge.

The accompanying illustration represents full size the New Idea Spring Hinge, which is put on the market by the Stover Mfg. Company, Freeport, Ill. It indicates satisfactorily the construction and special features of the hinge, in which, it will be observed, are some new features. The

can be used with any size of coupling; that it is inexpensive and does it work without excess of friction, thus saving wear. We are also advised that it is made of lighter wire than is used in their other makes, thus securing more flexibility while it is still sufficiently strong and durable. It is stated by the manufacturers, in their announcement on page 43,



The New Idea Spring Hinge.

manufacturers lay special stress upon the fact that the hinge holds the door strongest at the closing point; that the spring is covered, protecting it from the weather; that there is an exceptionally light amount of strain upon the spring while in actual use. Enlarging upon one of these features, the company explain that the spring has three to four times more resistance at the closing point than others on the market, and that the resistance gradually decreases in opening the door. The hinge is also referred to as subject to less than one-half the actual working strain of any other. The illustration given represents the No. 1 hinge, a No. 2 being also made larger and stronger, 4 x 4 inches, which is intended for use on large doors.

Hub Thill Spring.

Butts & Ordway, 147 Pearl street, Boston, Mass., are putting on the market a new thill spring called the Hub, which is



Hub Thill Spring.

illustrated in the accompanying cut, which shows its form and the respects in which it differs from other similar goods on the market. The points are specially made in regard to it that there is no projecting edge to tear the sponge or wash cloth; that it

that they will send a sample pair on application to any hardware, carriage or saddlery house desiring it.

The Champion Blotter Bath.

This article, which is manufactured by the F. F. Adams Company, Erie, Pa., is represented in the accompanying illustration.



Fig. 1.—The Champion Blotter Bath.

tion, Fig. 1. It consists of a japanned metal case, neatly trimmed, measuring about 12 inches in length by 10 inches in width and 3½ inches in depth outside. The case incloses three porous tile slabs, which are represented in Fig. 2. These slabs are grooved out in such a manner as to permit them to absorb the water either slowly or rapidly, at the will of the operator; when little copying is required the water being kept low so as to come only in contact with the points of support in the tile, or kept high so as to come in contact with the thick part of the body of the tile when a great deal of copying is to be done. The pads are placed on top of the tiles by which they are evenly moistened with

the requisite amount of moisture. The pads are made especially for this purpose, and are referred to as possessing peculiar absorbing qualities adapting them to this use, while they are also especially durable. They are designated as the Champion copying pads. Simple directions for their use are given, and it is pointed out that the porous tile slabs will at once absorb moisture, and in turn gradually transmit it to the pads, which will retain for an indefinite time the evenly distributed moist surfaces desired for copying. The points are also made that the bath will not become foul, and that it combines the feature of being always ready with the sterling qualities of simplicity, neatness and

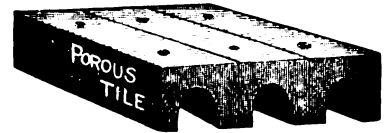


Fig. 2.—Porous Tile for Blotter Bath.

general convenience, and the claim is made that it will yield the most satisfactory results. The bath is made in two sizes, the smaller of which is illustrated above, the larger sizes containing five tile slabs instead of three. The circular of the company gives a number of testimonials from houses who have used the bath, a number of well-known hardware concerns being among them.

Standard Fibre Ware.

The Standard Fibre Ware Company now have their factory in active operation at Mankato, Minn., turning out seamless water-proof pails, slop-jars, wash-basins, keelers, &c., which are made of flax fiber. They have purchased the sole right to operate under ten patents, necessary to this branch of manufacture, in the States of Michigan, Illinois and Wisconsin and all States and Territories west of the Mississippi River. As flax fiber is expensive, they have located their factory in the great flax-producing section of the country, in which the stock can, of course, be had more cheaply than elsewhere. The machinery is mostly novel, being especially adapted to the manufacture of paper ware. The patent on pressed-ware dies covers the process of pressing out the water from the board through the pores of the wooden dies. Other machinery consists of pail presses, pail calenders, machines for trimming off the ends of pails, for bending and forcing in bottoms, for rolling hoops into shape to go over the top edges, also to go over the bottom edge or chime, &c. While a superior paper pail can be made with these machines, flax fiber tow makes a peculiarly tenacious stock, capable of being finished into goods of remarkable lightness and durability.

The tow is, of course, first beaten to a pulp, which is done by ordinary beating machines. If intended for pail bottoms or pressed ware, it is run out on a board machine, and for pails it is run out on a pail machine or winder. Each article of pressed ware, when wet, is subjected to a pressure of 80 tons, and when nearly dry to a pressure of 120 tons. Water-proofing is a very important process. A solution is used of such a character that the ware can thereafter be baked gradually until a heat of about 250° F. is reached, during which the substance of the water-proofing and stock is oxidized, and the article is made waterproof. But to make it proof against hot water it is further treated with another preparation and baked to 225°. The great superiority of flax fiber over other stock in making such ware is claimed to be its strength of fiber to bear the corrugating,

curling, pressing and water-proofing processes. The ovens are heated by steam in such a manner as to secure perfect uniformity of temperature.

In all their operations the company have sought to produce a good article and not a cheap one, believing that their policy would prove to be the best in the long run. They direct special attention to their patent process of affixing the bottom iron hoops to their pails. The hoop is so attached as to protect the edge, at the same time reaching to and supporting the bottom of the vessel. Besides this support the bottom is fitted into a corrugation made on the side of the pail, thus doubly securing it. Each vessel is highly finished with a superior coating of enamel, and the best grade is hand-painted and decorated, afterward being baked to secure a lasting finish, remove all taste or odor, destroy all injurious mineral properties, and to fit it to hold unaffected any liquid that may be put in it.

The Emery Knife Sharpeners and Oil Stones.

The Tanite Company, Stroudsburg, Pa., are putting on the market the Solid Emery Oil Stone herewith represented, Fig. 1, and the Knife Sharpener shown in

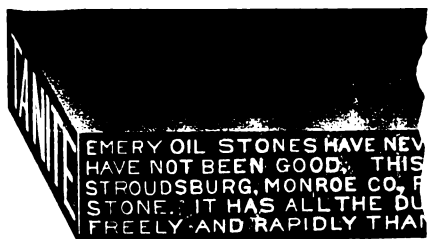


Fig. 1.—Solid Emery Oil Stone.

Fig. 2. The latter article consists of a wooden stick three times coated with fine emery, and is referred to as possessing especial advantages over the old-fashioned style and other goods for the purpose put on the market. Its durability, the efficiency with which it does its work, and the low price at which it is offered are points specially made in regard to it, and it is pointed out that it can be used for kitchen knives and carvers, for sickles, lawn-mower knives and other cutting instruments. The solid emery oil-stone



Fig. 2.—Knife Sharpener.

shown in Fig. 1 is described as in all respects similar in quality to the well-known Tanite emery-wheels. Two grades of these stones are made, one for putting on a rough edge and one for a cutting edge on fine tools. The rough-edge stone is described as doing the same work that the grindstone will, and it is claimed that its work is performed with exceptional ease. The company advise us that they are putting these goods on the market as a prominent line, and are intending to offer them exclusively to the hardware trade.

Curley's Patent Corkscrew.

This article, illustrated above, is put on the market by Dame, Stoddard & Kendall, Boston, Mass. It is made entirely of steel. As indicated in the cut, the shank of the screw is given play in the handle, with a construction which is referred to as affording a powerful leverage by which

the corkscrew is enabled to do its work with exceptional facility. The directions given for the use of the corkscrew are: That the bottle be placed on its base, the screw inserted in the cork in the ordinary way, and when the inside of the bell strikes the top of the bottle, the corkscrew is still kept turning, being slightly pulled at the same time, and in this manner it is claimed that the most obstinate corks can

foundation. The works have been in constant operation for some time, employing a force of about 300 men. Prospects are reported bright and the company expect to gradually increase their force to 500 men.

Grip Ice-Creeper.

The Improved All-Steel Grip Ice-Creeper illustrated in the accompanying cut is put



Curley's Patent Cork Screw.

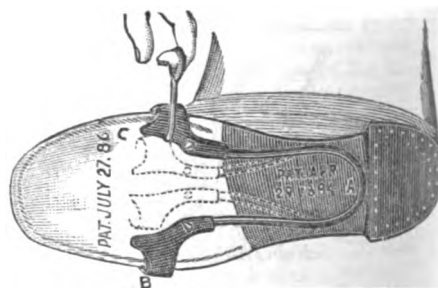
be twisted out with ease. The screw is so adjusted in the handle that, when broken, a new one can be easily substituted.

The growth of Mexican trade is shown by Treasury Department statistics. During the fiscal year ending June last the total exports from this country were \$48,885,-

on the market by the Penn Lock Works, 142 North Fourth street, Philadelphia, Pa., whose New York office is with W. H. Jacobus & Co., 90 Chambers street, New York. The points emphasized in regard to this creeper are that it has steel points; that no screws or straps are required; that it is quickly applied and will hold fast.

In applying, the part A is placed against the heel of the shoe, and acts as a brace, the clip B being placed on the outer edge of the sole, and the clip C sprung into place with the hand or button hook, as shown in the cut. The spring

and points of this creeper are made of tempered steel, and the clips of wrought steel. Three sizes are manufactured—No. 1 for



Improved All-Steel Grip Ice Creeper.

We are informed that the report that the plant of the Lafayette Car Works, at Lima, Ohio, had recently resumed operations after a long shut-down is without

ladies, No. 2 for soles measuring less than 3½ inches in width, and No. 3 for soles measuring more than 3½ inches in width. They are packed one dozen pair in a box.

Wrought (Steel).....	dis 70&10
Fast Joint Narrow.....	dis 70&10
Fast Joint L. Narrow.....	dis 70&10
Fast Joint Broad.....	dis 70&10
Loose Joint Broad.....	dis 70&10
Table Butts, Back Flaps, &c.....	dis 70&10
Inside Blind, Regular.....	dis 70&10
Inside Blind, Light.....	dis 70&10
Blind Pin.....	dis 70&10
Bronzed Wrought Butts.....	dis 40&10 40&10&5

Calipers.—See Compasses.

Calks, Tee.....	dis 54&5
Sautler.....	dis 54&5
Dewicks.....	dis 54&5

Can Openers.

Messenger's Comet.....	dis 30.00, dis 35
Duplex.....	dis 35, dis 15
Lyman's.....	dis 35, dis 30
No. 4, French.....	dis 35, dis 30
No. 5, Iron handle.....	dis 35, dis 30
Eureka.....	dis 35, dis 30
Sardine Scissors.....	dis 35, dis 30
Star.....	dis 35, dis 30
Sprague, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	dis 35, dis 30
World's Best.....	dis 35, dis 30
Universal.....	dis 35, dis 30
Domestic.....	dis 35, dis 30
Champion.....	dis 35, dis 30

Cards.

Horse and Curry.....	dis 10&10 10&10&10
Cotton.....	dis 10&10 10&10&10
Wool.....	dis 10&10 10&10&10

Carpet Stretchers.

Cast Steel, Polisher.....	dis 35
Cast Iron, Steel Points.....	dis 35
Socket.....	dis 35
Bullard's.....	dis 35

Carpet Sweepers.

Bissell No. 5.....	dis 17.00
Bissell No. 7 New Drop Pan.....	dis 19.00
Bissell Grand.....	dis 19.00
Grand Rapids.....	dis 19.00
Crown Jewel.....	dis 19.00
Magie.....	dis 19.00
Jewel.....	dis 19.00
Improved Parlor Queen, Nickel Trimmed.....	dis 19.00
Improved Parlor Queen, Japanned Trimmed.....	dis 19.00
Excelsior.....	dis 19.00
Garland.....	dis 19.00
Parlor Queen.....	dis 19.00
Housewife's Delight.....	dis 19.00
Queen.....	dis 19.00
Queen, with band.....	dis 19.00
King.....	dis 19.00
Hub.....	dis 19.00
Wood Improved.....	dis 19.00
Hub.....	dis 19.00
Cog Wheel.....	dis 19.00

Cartridges.—See Ammunition.

Casters.....	New list:
Bed.....	dis 55 @ 55&5
Plate.....	dis 55 @ 55&5
Shadow Socket.....	dis 55 @ 55&5
Deep Socket.....	dis 55 @ 55&5
Yale Casters, list May, 1884.....	dis 55 @ 55&5
Yale, Gem.....	dis 55 @ 55&5
Martin's Patent (Phoenix).....	dis 55 @ 55&5
"Giant" Truck Casters.....	dis 55 @ 55&5
Stationary Truck Casters.....	dis 55 @ 55&5

Castle Leaders.....	dis 70
Mumson, Beckley & Co.'s.....	dis 70
Sargent's.....	dis 70
Hotchkiss.....	dis 70
Peck, Stow & W. Co.....	dis 70

Chain.....	dis 70
Trace, 6-10-2, exact sizes, 1/2 pair, 1.03.....	dis 50&10
Trace, 6-10-3, exact sizes, 1/2 pair, .92.....	dis 50&10
Trace, 7-10-2, exact sizes, 1/2 pair, 1.11.....	dis 50&10
NOTE.—Traces, "Regular" sizes 3/4 net pair less than exact.	

Log, Fifth, Stretcher, and other fancy Chains, list																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						</
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Door Por. Por. Nickel.....\$2.00 @ \$2.25
Door Por. Plated, Nickel.....\$2.00 @ \$2.25
French Porcelain, new list.....dis 55¢10¢ @ \$2.10
Hematoide Door Knob, new list.....dis 40¢10¢ @ \$2.10
Yale & Towne Wood Knobs, list Dec. 1885.....dis 40¢
Furniture Plain.....75¢ gross inch. dis 10¢
Furniture, Wood Screws.....dis 25¢10¢
Base, Rubber Tip.....dis 70¢10¢25¢
Picture, Judd's.....dis 60¢10¢10¢ @ 70¢
Picture, Herkimer.....dis 70¢10¢
Picture, Herkimer.....dis 70¢10¢
Shutter, Porcelain.....dis 55¢10¢
Carriage, Jannaped.....\$ gross 80¢, dis 40¢10¢

Ladies.
Melting, Sargon's.....dis 55¢10¢
Melting, Reading.....dis 35¢10¢
Melting, Monroe's Patent.....\$ doz. \$4.00, dis 40¢
Melting, P. S. & W.....dis 35¢10¢ @ 40¢
Melting, Warner's.....dis 40¢

Lawn Mowers.
Standard List.....dis 50¢10¢
Enterprise.....dis 60¢10¢

Laundry.
Tubular, Plain, with Guards.....\$ doz \$4.00 @ \$4.50
Tubular, Lift Wire, with Guards.....\$ doz \$5.00 @ \$4.75
Tubular, Square Plain, with Guards.....\$ doz \$4.00 @ \$4.75
Tubular, Cq Lift Wire, with Guards.....\$ doz \$4.25 @ \$4.50
Without Guards, 25¢ a dozen less.
Police, small, \$6.00; Med. \$7.25; Large, \$8.75, dis 30¢25¢

Leam Mowers.
Corral Lined, No. 1.....\$ doz. \$6.00, dis 35¢30¢
Food, No. 2.....\$ doz. \$3.00, dis 35¢
Wool, Common.....\$ doz \$1.70 @ 1.75
Ounlap Improved.....\$ doz. \$2.75, dis 30¢
Jamies.....No. 1, \$5; No. 2, \$3; 15, \$18 \$ doz. dis 35¢10¢
Jennings' "Star".....\$ doz \$2.50
The "Boss".....\$ doz \$2.50
Dean's.....No. 1, \$ doz \$6.50; 2, \$3.25; 3, \$1.90
Little Giant.....dis 60¢ @ 50¢25¢
King.....dis 40¢25¢

Lines.
Jotton and Linen Fish, Draper's.....dis 60¢
Draper's Chalk.....dis 60¢
Draper's Mason's Linen, 54 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25.....dis 55¢
Jotton Chalk.....dis 55¢
Sanson, Cotton, No. 4, \$3; No. 4 1/2, \$3.50.....dis 10¢
Silk, No. 5, \$2.50; No. 6, \$3.00; No. 7, \$3.50; No. 8, \$4.00; No. 9, \$4.50; No. 10, \$5.00; No. 11, \$5.50; No. 12, \$6.00; No. 13, \$6.50; No. 14, \$7.00; No. 15, \$7.50; No. 16, \$8.00; No. 17, \$8.50; No. 18, \$9.00; No. 19, \$9.50; No. 20, \$10.00; No. 21, \$10.50; No. 22, \$11.00; No. 23, \$11.50; No. 24, \$12.00; No. 25, \$12.50; No. 26, \$13.00; No. 27, \$13.50; No. 28, \$14.00; No. 29, \$14.50; No. 30, \$15.00; No. 31, \$15.50; No. 32, \$16.00; No. 33, \$16.50; No. 34, \$17.00; No. 35, \$17.50; No. 36, \$18.00; No. 37, \$18.50; No. 38, \$19.00; No. 39, \$19.50; No. 40, \$20.00; No. 41, \$20.50; No. 42, \$21.00; No. 43, \$21.50; No. 44, \$22.00; No. 45, \$22.50; No. 46, \$23.00; No. 47, \$23.50; No. 48, \$24.00; No. 49, \$24.50; No. 50, \$25.00; No. 51, \$25.50; No. 52, \$26.00; No. 53, \$26.50; No. 54, \$27.00; No. 55, \$27.50; No. 56, \$28.00; No. 57, \$28.50; No. 58, \$29.00; No. 59, \$29.50; No. 60, \$30.00; No. 61, \$30.50; No. 62, \$31.00; No. 63, \$31.50; No. 64, \$32.00; No. 65, \$32.50; No. 66, \$33.00; No. 67, \$33.50; No. 68, \$34.00; No. 69, \$34.50; No. 70, \$35.00; No. 71, \$35.50; No. 72, \$36.00; No. 73, \$36.50; No. 74, \$37.00; No. 75, \$37.50; No. 76, \$38.00; No. 77, \$38.50; No. 78, \$39.00; No. 79, \$39.50; No. 80, \$40.00; No. 81, \$40.50; No. 82, \$41.00; No. 83, \$41.50; No. 84, \$42.00; No. 85, \$42.50; No. 86, \$43.00; No. 87, \$43.50; No. 88, \$44.00; No. 89, \$44.50; No. 90, \$45.00; No. 91, \$45.50; No. 92, \$46.00; No. 93, \$46.50; No. 94, \$47.00; No. 95, \$47.50; No. 96, \$48.00; No. 97, \$48.50; No. 98, \$49.00; No. 99, \$49.50; No. 100, \$50.00; No. 101, \$50.50; No. 102, \$51.00; No. 103, \$51.50; No. 104, \$52.00; No. 105, \$52.50; No. 106, \$53.00; No. 107, \$53.50; No. 108, \$54.00; No. 109, \$54.50; No. 110, \$55.00; No. 111, \$55.50; No. 112, \$56.00; No. 113, \$56.50; No. 114, \$57.00; No. 115, \$57.50; No. 116, \$58.00; No. 117, \$58.50; No. 118, \$59.00; No. 119, \$59.50; No. 120, \$60.00; No. 121, \$60.50; No. 122, \$61.00; No. 123, \$61.50; No. 124, \$62.00; No. 125, \$62.50; No. 126, \$63.00; No. 127, \$63.50; No. 128, \$64.00; No. 129, \$64.50; No. 130, \$65.00; No. 131, \$65.50; No. 132, \$66.00; No. 133, \$66.50; No. 134, \$67.00; No. 135, \$67.50; No. 136, \$68.00; No. 137, \$68.50; No. 138, \$69.00; No. 139, \$69.50; No. 140, \$70.00; No. 141, \$70.50; No. 142, \$71.00; No. 143, \$71.50; No. 144, \$72.00; No. 145, \$72.50; No. 146, \$73.00; No. 147, \$73.50; No. 148, \$74.00; No. 149, \$74.50; No. 150, \$75.00; No. 151, \$75.50; No. 152, \$76.00; No. 153, \$76.50; No. 154, \$77.00; No. 155, \$77.50; No. 156, \$78.00; No. 157, \$78.50; No. 158, \$79.00; No. 159, \$79.50; No. 160, \$80.00; No. 161, \$80.50; No. 162, \$81.00; No. 163, \$81.50; No. 164, \$82.00; No. 165, \$82.50; No. 166, \$83.00; No. 167, \$83.50; No. 168, \$84.00; No. 169, \$84.50; No. 170, \$85.00; No. 171, \$85.50; No. 172, \$86.00; No. 173, \$86.50; No. 174, \$87.00; No. 175, \$87.50; No. 176, \$88.00; No. 177, \$88.50; No. 178, \$89.00; No. 179, \$89.50; No. 180, \$90.00; No. 181, \$90.50; No. 182, \$91.00; No. 183, \$91.50; No. 184, \$92.00; No. 185, \$92.50; No. 186, \$93.00; No. 187, \$93.50; No. 188, \$94.00; No. 189, \$94.50; No. 190, \$95.00; No. 191, \$95.50; No. 192, \$96.00; No. 193, \$96.50; No. 194, \$97.00; No. 195, \$97.50; No. 196, \$98.00; No. 197, \$98.50; No. 198, \$99.00; No. 199, \$99.50; No. 200, \$100.00; No. 201, \$100.50; No. 202, \$101.00; No. 203, \$101.50; No. 204, \$102.00; No. 205, \$102.50; No. 206, \$103.00; No. 207, \$103.50; No. 208, \$104.00; No. 209, \$104.50; No. 210, \$105.00; No. 211, \$105.50; No. 212, \$106.00; No. 213, \$106.50; No. 214, \$107.00; No. 215, \$107.50; No. 216, \$108.00; No. 217, \$108.50; No. 218, \$109.00; No. 219, \$109.50; No. 220, \$110.00; No. 221, \$110.50; No. 222, \$111.00; No. 223, \$111.50; No. 224, \$112.00; No. 225, \$112.50; No. 226, \$113.00; No. 227, \$113.50; No. 228, \$114.00; No. 229, \$114.50; No. 230, \$115.00; No. 231, \$115

Silver Lake, C. Quality White, only..... 77c @ 25c
 Sylvan Spring, Extra Braided, White..... 34c
 Sylvan Spring, Extra Braided, Drab..... 34c
 Semper Idem, Braided, White..... 34c
 Egyptian India Hemp, Braided..... 34c
 Samson, Braided, White Cotton..... 55c dia 30 @ 30c 1/2
 Samson, Braided, Drab Cotton..... 55c dia 30 @ 30c 1/2
 Samson, Braided Italian Hemp..... 55c dia 30 @ 30c 1/2
 Samson Braided Linen..... 80c dia 30 @ 30c 1/2

Shack Looks.
 Clark's No. 1, \$10.00; No. 2, \$8.00 * gross..... dia 25c 1/2
 Ferguson's..... dia 30c 1/2
 Morris and Triumph, list Aug. 16, 1886..... dia 60c 1/2
 Victor..... 60c 1/2
 Walker's..... dia 10c
 Atwood Mfr. Co..... dia 25c @ 30c 1/2
 Rading..... dia 60c 1/2 @ 60c 1/2
 Hammond's Window Springs..... dia 70c
 Common Sense, Jap. d. Cop'd and Br'nd..... * gross \$1.00
 Common Sense, Nickel Plated..... * gross \$1.00
 Universal..... dia 30c
 Kempshall's Gravity..... dia 60c
 Corbin's Dais, list February 16, 1886..... dia 60c 1/2
 Payson's Perfect..... dia 60c @ 60c 1/2
 Hugin's New and Improved Adjustable Bash Bal-
 ances, list Jan. 5, 1887..... dia 25c 1/2
 Hugin's New Bash Looks, list Jan. 5, '87, dia 25c 1/2
 Stoddard's "Practical"..... dia 10c
 W. M. C. Hand..... dia 70c
 Liesche's Nos. 100 & 110 * gro 85, 100, 110, dia 10c
 Davis, Bronze, Barnea Mfg. Co..... dia 50c
 Champion Safety, list March 1, 1888..... dia 55c 1/2
 Security..... dia 70c

Sash Weights.
 Solid Eyes..... * ton \$2

Sausage Stuffers or Millers.
 Miles' "Challenge"..... * dos \$20, dia 50c 50c 1/2
 Perry..... * dos No. 1, \$15; No. 2, \$12, dia 50c 50c 1/2
 Draw Cut No. 4..... each, \$30.00, dia 30c
 Enterprise Mfg Co..... dia 30c 1/2 @ 30c
 Sewer..... dia 40c 1/2

Saws.
 Diaston's Circular..... dia 45 @ 45c 1/2; Extras some
 Diaston's Cross Cut, dia 45 @ 45c 1/2 } times given by
 Diaston's Hand..... dia 25 @ 25c 1/2 } jobbers.
 Atkins' Circular..... dia 50c
 Atkins' Silver Steel Diamond X Cuts..... * foot 70c
 Atkins' Special Steel Dexter X Cuts..... * foot 60c
 Atkins' Special Steel Diamond X Cuts..... * foot 30c
 Atkins' Champion and Electric Tooth..... dia 20c
 Atkins' Hollow Back X Cuts..... * foot 27 @ 25c
 Atkins' Shingle, Mulay, Drag, &c..... dia 45c
 W. M. C. Hand..... dia 30c 1/2 @ 30c 1/2
 W. M. C. & C. Champion X Cuts, Regular * foot 24c 1/2
 W. M. C. & C. X Cuts, Rio Back..... * foot 27c 1/2
 Peace Cross Cut and Mill..... dia 40c 1/2
 Peace Hand Panel and Rip..... dia 30c 1/2 @ 30c 1/2
 Peace Cross Cut, Standard..... * foot 25c
 Peace Cross Cut, Thin Back..... * foot 27c 1/2
 Richardson's Circular and Mill..... dia 45 @ 45c 1/2
 Richardson's X-Cuts, No. 1, 50c; No. 2, 37c; No. 3, 34c

Saw Sets.
 Griffin's Hack Saws, complete..... dia 40c 1/2 @ 50c
 Griffin's Hack Saw, Blades only..... dia 40c 1/2 @ 50c
 Star Hack Saws and Blades..... dia 25c
 Diamond Hack Saws and Blades..... dia 25c
 Eureka and Crescent..... dia 25c

Saw Frames.
 White Vermont..... * gro \$9 @ 10c
 Red, Polished, and Varnished..... * dos \$1.50, dia 25c

Scales.
 Stillman's Machine..... * dos \$5.00 and \$7.75, dia 40c 1/2
 Stillman's Imita. * dos \$3.25 and \$5.25, dia 40c 1/2
 Common Lever..... * dos \$5.00, dia 40c 1/2
 Morrill's No. 1, \$15.00; No. 3 & 4, \$21..... dia 40c 1/2 @ 50c
 Leach's..... No. 0, \$3.00; No. 1, \$15.00, dia 15 @ 20c
 Nash's..... dia 30c 1/2 @ 30c 1/2
 Hammer, Hotchkiss..... \$5.50, dia 10c
 W. M. C. & C. Call Co.'s New Patent..... dia 40c 1/2
 Bemis & Call Co.'s Lever and Spring Hammer..... dia 30c 1/2
 Bemis & Call Co.'s Plate..... dia 10c
 Bemis & Call Co.'s Cross Cut..... dia 12c 1/2
 Alken's Genuine..... \$13.00, dia 50c 1/2
 Alken's Imitation..... \$7.00, dia 40c 1/2
 Hart's Patent Lever..... dia 20c
 Hart's Scales, 20, No. 1, \$5.50, dia 40c 1/2 @ 50c
 Atkins' Lever..... per dos No. 1, \$6.00; No. 2, \$8.00
 Atkins' Criterion..... per dos \$7.00
 Crossman & Keller, No. 1, \$15.00; No. 2, \$24.00, dia 40c 1/2

Saw Teels.
 Atkins Perfection..... \$15.00; Excelsior \$6.00 * dos

Scales.
 Hatch, Hunter, No. 171, good quality..... * dos \$1
 Hatch, Tea, No. 161..... dia 30c 1/2 @ 30c 1/2
 Union Platform, Plain..... \$2.10 @ 2.30
 Union Platform, Striped..... \$2.30 @ 2.30
 Chatillon's Grocers' Trip Scales..... dia 50c
 Chatillon's Eureka..... dia 25c
 Chatillon's Favorite..... dia 25c
 Family "cupball"..... dia 30c 1/2
 Rielle Bros. Platform..... dia 5c

Meale Beams.
 Scale Beams, list of Jan. 12, 2nd, dia 50c 1/2 @ 50c 1/2
 Chatillon's No. 1..... dia 40c
 Chatillon's No. 2..... dia 50c

Screws.
 Box, 1/2 inch Box Scraper (S. R. & L. Co.) \$6.50, dia 30c 1/2
 Box, 1 Handle..... * dos \$4.00, dia 10c
 Box, 3 Handle..... * dos \$6.00, dia 10c
 Defiance Box and Ship..... dia 20c 1/2
 Foot..... dia 20c 1/2 @ 20c 1/2
 Ship, Common..... * dos \$5.50, dia 10c
 S. R. & L. Co.'s Foot..... dia 10c

Screen Window and Door Frames.
 Porter's Pat. Window and Door Frame..... dia 25c 1/2
 Screen Corner Irons, Warner's..... dia 33c 1/2 @ 33c 1/2
 Stearns' Frames and Corners..... dia 25c @ 25c 1/2

Screw Drivers.
 Douglas Mfr Co..... dia 20c 1/2 @ 20c 1/2
 Diaston's..... dia 20c 1/2
 Diaston's Patent Excelsior..... dia 20c 1/2
 Buck Bros..... dia 30c
 Stanley R. & L. Co.'s Varnished Handles..... dia 65c 1/2
 Stanley R. & L. Co.'s Black Handles..... dia 60c 1/2
 Sargent & Co.'s No. 1 Forged Stange..... dia 60c 1/2 @ 10c 1/2
 Sargent & Co.'s No. 30, 10 and 60..... dia 60c 1/2 @ 70c
 Knapp & Cowles' No. 1 Extra..... dia 60c @ 60c 1/2
 Knapp & Cowles' No. 0 & 4..... dia 50c 1/2 @ 50c 1/2
 Stearns'..... dia 25c 1/2 @ 25c 1/2
 Gay & Parsons..... dia 35c
 Champion..... dia 25c 1/2
 Clark's Patent..... dia 30c @ 30c 1/2
 Clark's Patent..... dia 30c
 Clark's Patent..... dia 30c
 Ellrich's Socket and Ratchet..... dia 25c @ 25c 1/2
 Allard's Sperial new list..... dia 25c
 Kolb's Common Range..... * dos \$4, dia 25c 1/2
 Syracuse Screw-Driver Bits..... dia 30c @ 30c 1/2
 Screw Driver Bits..... * dos, 50c @ 50c
 Screw Driver Bits, Lrrp..... dia 30c
 Iron, Hot, India Beta, No. 8, \$12..... dia 25c @ 25c 1/2
 P. D. & Co.'s, all Steel..... dia 50c

Screws.
 Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887
 Flat Head Iron..... dia 70c
 Round Head Iron..... dia 65c Ex. 10c extra
 Flat Head Brass..... dia 65c given by
 Round Head Brass..... dia 60c jobbers.
 Flat Head Bronze..... dia 65c
 Round Head Bronze..... dia 60c

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CURRENT METAL PRICES.

NOVEMBER 21, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:

3/4 to 2 in. round and square... \$ 1.90 @ 2.00¢

1 to 6 in. x 3/4 to 1 in. ... \$ 2.10 @ ...

Refined Iron:

3/4 to 2 in. round and square... \$ 2.10 @ ...

1 to 4 in. x 3/4 to 1 in. ... \$ 2.30 @ ...

4 1/2 to 6 in. x 3/4 to 1 in. ... \$ 2.30 @ ...

1 to 6 in. x 1/4 and 5-16 ... \$ 2.30 @ ...

Reds—3/4 and 1-16 round and sq. ... \$ 2.30 @ ...

Bands—1 to 6 x 3-16 to No. 12 ... \$ 2.30 @ 2.4¢

"Burden Best" Iron, base price ... \$ 3.00 @ ...

Burden's "H. B. & S." Iron, base price ... \$ 2.80 @ ...

"Ulster" ... \$ 3.10 @ ...

Norway Rods ... 4.00 @ 5.00¢

Merchant Steel from Store.

Per pound.

Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots ... 2 1/2¢ @ 3¢

Best Cast Steel, base price in small lots ... 2 1/2¢ @ 2 3/4¢

Best Cast Steel Machinery, base price in small lots ... 5 1/2¢ @ 6¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

Common American. R. G. Cleaned.

10 to 16 ... \$ 2.75 @ 2.80¢ 3.25 @ ...

17 to 20 ... \$ 2.85 @ 3.00¢ 3.25 @ 3.50¢

21 to 24 ... \$ 3.00 @ 3.10¢ 3.50 @ ...

25 and 26 ... \$ 3.20 @ 3.50 @ ...

27 ... \$ 3.35 @ 3.75¢ 3.75 @ ...

28 ... \$ 3.50 @ 4.00 @ ...

B. B. 2d qual.

Galv'd, 14 to 20 ... \$ 4.50 @ 4.88 @ ...

Galv'd, 1 to 24 ... \$ 4.87 1/2 @ 4.75 @ ...

Galv'd, 25 to 26 ... \$ 5.25 @ 5.12 @ ...

Galv'd, 27 ... \$ 5.62 1/2 @ 5.48 @ ...

Galv'd, 28 ... \$ 6.00 @ 5.85 @ ...

Patent Planchet ... \$ 10¢ @ 10¢

Russia ... \$ 9 1/4¢ @ 10¢

American Cold Rolled B. B. ... \$ 5¢ @ 7¢

English Steel from Store.

Best Cast ... \$ 15¢

Extra Cast ... \$ 16 1/2¢ @ 17¢

Swaged, Cast ... \$ 16¢

Best Double Shear ... \$ 15¢

Bilster, 1st quality ... \$ 10¢

German Steel, Best ... \$ 10¢

2d quality ... \$ 9¢

3d quality ... \$ 8¢

Sheet Cast Steel, 1st quality ... \$ 15¢

2d quality ... \$ 14¢

3d quality ... \$ 12 1/2¢

METALS.

Tin. Per lb

Banca, Pigs ... 25¢

Straits, Pigs ... 25¢

English, Pigs ... 24 1/2¢

Straits in Bars ... 26¢

Tin Plates.

Charcoal Plates—Bright. Per box.

Melny Grade. IC 10 x 14 ... \$6.00 @

IC 12 x 18 ... 6.25 @

IC 14 x 20 ... 6.00 @

IC 20 x 28 ... 12.50 @

IX 10 x 14 ... 7.50 @

IX 12 x 18 ... 7.75 @

IX 14 x 20 ... 7.50 @

IX 20 x 28 ... 15.50 @

DC 12 1/2 x 17 ... 7.75 @

DX 12 1/2 x 17 ... 7.85 @

Call and Grade. IC 10 x 14 ... 6.00 @

IC 12 x 18 ... 6.25 @

IC 14 x 20 ... 6.00 @

IX 10 x 14 ... 7.50 @

IX 12 x 18 ... 7.75 @

IX 14 x 20 ... 7.50 @

Allway Grade. IC 10 x 14 ... \$5.75 @

IC 12 x 18 ... 6.50 @

IC 14 x 20 ... 6.25 @

IX 10 x 14 ... 7.50 @

IX 12 x 18 ... 7.75 @

IX 14 x 20 ... 7.50 @

DC 12 1/2 x 1700 @

DX 12 1/2 x 17 ... 6.00 @

Coke Plates—Bright.

Steel Coke.—IC 10 x 14, 14 x 20 ... \$5.00 @

10 x 20 ... 7.50 @

20 x 28 ... 10.25 @

IX 10 x 14, 14 x 20 ... 5.75 @

IX 10 x 14, 14 x 20 ... 4.60 @

Charcoal Plates—Tern.

Dean Grade.—IC 14 x 20 ... \$4.60 1/2 @

20 x 28 ... 9.25 @

IX 14 x 20 ... 5.60 1/2 @

20 x 28 ... 11.25 @

Abecarne Grade.—IC 14 x 20 ... 4.50 @

20 x 28 ... 9.00 @

IX 14 x 20 ... 5.50 @

20 x 28 ... 10.80 @

Tin Boiler Plates.

IX 14 x 26 ... 112 sheets ... \$12.50 @ \$12.75

IX 14 x 28 ... 112 sheets ... 12.75 @

IX 14 x 31 ... 112 sheets ... 14.25 @

Copper.

Burr's Pig. Bar and Ingot, 4¢; Old Copper, 3¢

"D. Manufactured (including all articles of which Copper is a component of chief value), 45¢ ad valorem.

Ingot.

Lake ... @ 18 1/4¢

"Anchor" Brand ... @ 18¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound.									
			Over 64 oz.	64 oz.	64 oz.	64 oz.	64 oz.	64 oz.	64 oz.	64 oz.	64 oz.	Less than 64 oz.
90	72	25	25	25	25	25	25	25	25	25	25	38
81	72	25	25	25	25	25	25	25	25	25	25	34
86	96	25	25	25	25	25	25	25	25	25	25	36
86	96	25	25	25	25	25	25	25	25	25	25	36
48	96	25	25	25	25	25	25	25	25	25	25	36
48	96	25	25	25	25	25	25	25	25	25	25	36
60	96	25	25	25	25	25	25	25	25	25	25	36
60	96	25	25	25	25	25	25	25	25	25	25	36
84	96	25	25	25	25	25	25	25	25	25	25	36
84	96	25	25	25	25	25	25	25	25	25	25	36
Over 84 in. wide		25	25	25	25	25	25	25	25	25	25	36

All Bath Tub Sheets. 16 oz. 14 oz. 12 oz. 10 oz. Per pound. \$0.53 0.80 0.82 0.85

Bolt Copper, 3/4 inch diameter, and over, per pound. 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 3 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

Per pound.

14 ounce to square foot and heavier ... 28¢

12 ounce and up to 14 ounce to square foot ... 29¢

10 ounce and up to 12 ounce ... 31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 18 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each ... 8¢

Tinning sheets on one side, 30 x 60 each ... 30¢

For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.) each ... 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.) each ... 13¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.) each ... 19¢

Tinning sheets on one side, other sizes, per square foot ... 2 1/2¢

For tinning both sides double the above prices.

Planished Copper.

Planished Copper List May 5, 1888 ... Net

Brass and Copper Tubes.

Seamless Copper	Seamless Brass
3/4 inch \$ 50¢	3/4 inch \$ 47¢
1/2 inch \$ 44¢	1/2 inch \$ 41¢
3/8 inch \$ 42¢	3/8 inch \$ 39¢
1/4 inch \$ 40¢	1/4 inch \$ 37¢
3/16 inch \$ 38¢	3/16 inch \$ 36¢
1/8 inch \$ 37¢	1/8 inch \$ 34¢
1/16 inch \$ 34¢	1/16 inch \$ 31¢

Roll and Sheet Brass.

Discount from list. 10 @ 15 x

Spelter.

Duty: Pig. Bars and Plates, \$1.50 @ 100 lb. 5 1/2¢ @ 6¢

Western Spelter ... 5 1/2¢ @ 6¢

"Bergenport" ... 5 1/2¢ @ 6¢

"Bertha" ... 7 1/4¢ @ 8¢

Zinc.

Duty: Sheet, 2 1/4¢ @ 100 lb. 6 1/2¢ @ 7 1/2¢

600 lb casks ... 6 1/2¢ @ 7 1/2¢

Per lb ... 7 1/2¢ @ 8 1/2¢

Lead.

Duty: Pig, \$2 @ 100 lb. Old Lead, 2¢ @ 100 lb. Pipe and Sheets, 3¢ @ 100 lb.

American ... 4 1/4 @ 4 1/2¢

Newark ... 4 1/4 @ 4 1/2¢

Bar ... 5 1/2¢ @ 6 1/2¢

Pipe, subject to trade discount ... 6 1/2¢ @ 7 1/2¢

Tin-Lined Pipe, subject to trade discount ... 15¢ @ 16¢

Block Tin Pipes, subject to trade discount ... 45¢ @ 46¢

Sheet, subject to trade discount ... 7 1/4¢ @ 8 1/4¢

Solder.

1/2 @ 1/4 (Guaranteed) ... 16¢

Extra Wiping ... 13 1/2¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson ... \$ 13 1/4 @ 14¢

Hallett's ... 11 1/2¢

Plumbers' Brass Work.

Discount per cent.

Ground Bibbs and Stops ... 55¢ @ 10¢

Ground Stops, Hydrant Cocks, &c. ... 55¢ @ 10¢

Corporation Cocks ... 55¢ @ 10¢

Corporation Cocks, "Mueller" Pattern, from Western list. 55¢ @ 10¢

Ground Basin and Shampooing Cocks ... 50¢ @ 10¢

Compression Basin Cocks ... 50¢ @ 10¢

Compression Basin and Sink Cocks ... 50¢ @ 10¢

Compression Pantry Cocks ... 50¢ @ 10¢

Compression Double Basin and Shampooing Cocks ... 50¢ @ 10¢

Compression Double Bath Cocks ... 50¢ @ 10¢

Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks ... 50¢ @ 10¢

Basin Plugs and Basin Grates ... 55¢ @ 10¢

Bath and Wash Tray Plugs ... 55¢ @ 10¢

Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets ... 55¢ @ 10¢

Basin Clamps, Basin Joints and Strainers ... 55¢ @ 10¢

Boiler Couplings, Ground Face, per set \$1.25 ... 10¢

Boiler Couplings, Plain Face, per set \$1.30 ... 10¢

Water Back Valve and Flain Couplings, Soldering Nipples and Unions ... 55¢ @ 10¢

Union Joints ... 60¢ @ 10¢

Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides ... 55¢ @ 10¢

Hose Goods ... 55¢ @ 10¢

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.

Brass Globe Valves ... 60¢ @ 10¢

Finished Brass Globe Valves, with Finished Brass Wheels ... 60¢ @ 10¢

Brass Globe Valves, with Patent Wood Wheels ... 60¢ @ 10¢

Brass Globe Angle and Corner Valves ... 60¢ @ 10¢

Brass Radiator Angle Valves ... 60¢ @ 10¢

Brass Radiator Angle Valves, Frink's Patent ... 60¢ @ 10¢

Brass Cross and Check Valves ... 60¢ @ 10¢

Brass Check Valves ... 60¢ @ 10¢

Brass Hose Valves ... 60¢ @ 10¢

Brass and Iron Frink Valves ... 60¢ @ 10¢

Brass Safety Valves ... 60¢ @ 10¢

Brass Vacuum Valves ... 50¢ @ 10¢

Brass Whistle Valves ... 60¢ @ 10¢

Brass Balance, Back Pressure and Foot Valves ... 50¢ @ 10¢

Brass Butterfly and Throttle Valves ... 50¢ @ 10¢

Brass Pump Valves ... 50¢ @ 10¢

Brass Steam Cocks ... 57 1/2¢ @ 10¢

Brass Service, Meter and Union Meter Cocks ... 57 1/2¢ @ 10¢

Brass Whistles, Water Gauges and Oil Cups ... 60¢ @ 10¢

Brass Hollow Plug, Tallow and Globe Oil Cups ... 50¢ @ 10¢

Brass Lubricators ... 60¢ @ 10¢

Brass Air Valves ... 60¢ @ 10¢

Brass Air Cocks ... 60¢ @ 10¢

Brass Gauge Cocks ... 55¢ @ 10¢

Brass Cylinder Cocks and Steam Bibbs ... 50¢ @ 10¢

Brass Swing Joints and Expansion Joints ... 50¢ @ 10¢

Brass Test Pumps ... 50¢ @ 10¢

Brass Steam Fittings, Rough ... 60¢ @ 10¢

Brass Steam Fittings, Finished ... 50¢ @ 10¢

Brass Union Joints ... 60¢ @ 10¢

Brass Soldering Unions and Nipples ... 55¢ @ 10¢

Brass Hose Fittings, Fusible and Boiler Plugs ... 55¢ @ 10¢

Iron Body Globe, Angle, Cross and Check Valves ... 65¢ @ 10¢

Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves ... 65¢ @ 10¢

Iron Cocks, all Iron ... 65¢ @ 10¢

All Iron Valves ... 65¢ @ 10¢

Miscellaneous.

Discount per cent.

Cast Iron Fittings ... 70¢ @ 10¢

Plugs and Bushings ... 75¢ @ 10¢

Malleable Iron Unions ... 67 1/2¢ @ 10¢

Malleable Iron Fittings ... 75¢ @ 10¢

Paints.

Black, Lamp—Coach Painters' ... \$ 22 @ 24¢

Ordinary ... 12 @ 15¢

Black, Ivory Drop, fair ... 12 @ 15¢

Black Paint, in oil, kegs, 8¢; assorted cans, 11¢

Blue, Prussian, fair to best ... 40 @ 55¢

"Chinese dry" in oil ... 45 @ 55¢

"Ultramarine" ... 18 @ 30¢

Brown, Spanish ... 10 @ 15¢

"Van Dyke" ... 10 @ 15¢

Dryers, Patent American, ass'd cans, 9¢; kegs, 7¢

Green, Chrome ... 15 @ 20¢

Green, Chrome in oil ... 14 @ 18¢

Green, Paris ... good, 20¢; best, 25¢

Green, Paris in oil ... good, 20¢; best, 25¢

Iron Paint, Bright Red ... \$ 14 @ 15¢

Iron Paint, Brown ... \$ 14 @ 15¢

Iron Paint, Purple ... \$ 14 @ 15¢

Iron Paint, Ground in oil, Bright Red ... \$ 14 @ 15¢

Iron Paint, Ground in oil, Red ... \$ 14 @ 15¢

Iron Paint, Ground in oil, Brown ... \$ 14 @ 15¢

Iron Paint, Ground, Purple ... \$ 14 @ 15¢

Litharge ... 6¢ @ 10¢

Mineral Paints ... 2 @ 4¢

Orange Mineral ... 10¢ @ 15¢

Red Lead, American ... 11¢ @ 15¢

Red Venetian (Eng.) dry ... \$1.65 @ \$1.75

Red Venetian in oil, ass't'd cans, 11¢; kegs, 8¢

Red Indian Dry ... 9 @ 12¢

Rose Pink ... 10 @ 12¢

THE IRON AGE

THURSDAY, NOVEMBER 29, 1888.

The Hart Disk-Clutch Hoisting Machinery.

We present on this and the following two pages engravings showing different applications of an entirely new form of machine for giving motion to ropes, chains, &c. It was designed by Walter Hart, 2 and 4 Stone street, New York, and constitutes one of several interesting exhibits at the American Institute fair now held at New York. The object of the design was to provide an efficient machine for hoisting, lowering, pulling, hauling, easing, and transmitting power, manipulating ropes,

for the general purposes of a hoist; a specific application of the principle in a device for attachment to the hand-rope hoist, so as to change it at will to a power-hoist; another specific application for the safe lowering of boats. The aim of the production of this last was principally responsible for the invention.

Fig. 2 represents the sectional view of the clutching mechanism, and clearly explains the nature of this detail. In this a plane-faced disk, B, is shown keyed to a shaft, A. The drum C, which also is keyed to this shaft, has a number of longitudinal grooves; D is a loose bevel-faced disk with lugs fitting in the grooves in C, and

in Fig. 3. The device, as will be readily seen, is a complete departure from the hitherto usual mechanical method by which ropes or chains are drawn in or paid out. The apparatus now in use, whether simple or complex, invariably contains, as the principal part, a drum to which the rope or chain is made fast, and on which the one or the other is rolled for drawing in or hoisting, or unrolled for paying out or lowering. This method is not applicable when it is necessary for the rope or chain to be freed instantly and in its entirety. To accomplish this, a capstan-head is generally used, it being affixed to shaft ends, two or three

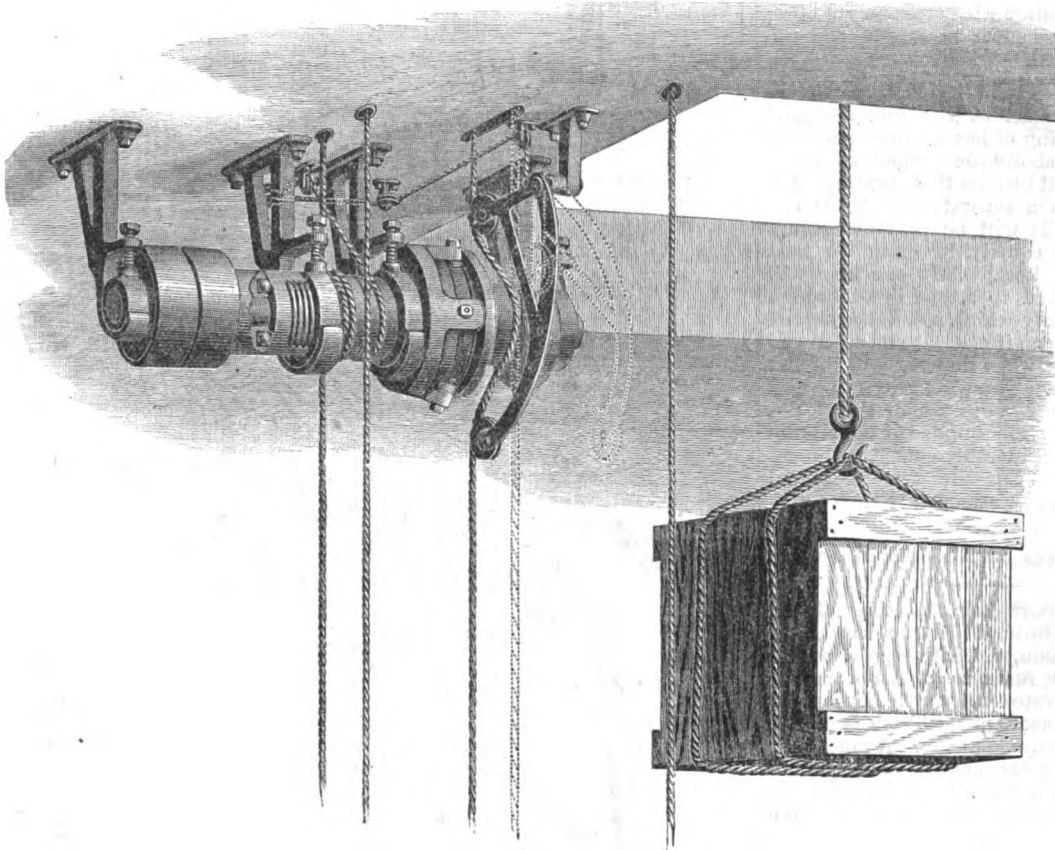


Fig. 1.—Hatchway Clutch Power Hoist.

NEW HOISTING MACHINERY, DESIGNED BY WALTER HART, NEW YORK.

haws, wire cable, belts and some classes of rigid objects, such as rods, bars and rails.

The essential feature of the machine is found in the arrangement of two disks so as to rotate in different planes, and, while rotating, to gradually grasp, tightly hold and gradually release any suitable object held between them, carrying it along with them in their motion of rotation. A lateral movement is given to one of the disks, by which it is caused to approach to or recede from the other, which permits not only of the placing of objects of different diameters or thickness between the disks, but allows of an exact adjustment of pressure, in accordance with the demand of the strain, whether for hoisting, lowering, drawing in or paying out. This lateral movement acts in conjunction with, or independently of, the rotary, and can be applied whether the machine is in motion or at rest. The engravings represent a sectional view of a double-acting machine

having a channeled projecting sleeve E. The threaded sleeve F, working on A, has several projecting arms, each of which carries an anti-friction roller. The arms are of different lengths, and with the rollers hold the disk D at such an angle with respect to the shaft A that the inner faces of the two disks B and D are brought parallel along one line of the radii above the shaft, and from that line diverge on both sides, a maximum being reached at the directly opposite line. The nut G encircles F, and is held in place by the standards H and I. Rotation of the nut obviously produces lateral motion in F. The collar K, keyed on the shaft A, is furnished with anti-friction rollers, and resists the thrust of the screw-sleeve F, which is in effect the strain of the load. It will be seen accordingly that the principal working parts are few in number, and substantial in construction.

One form of this hoisting machine Mr. Hart terms a clutch-winch is shown

turns or more of the rope being made on such capstan-head. This demands that the loose end of the rope or chain should be held taut, so as to prevent surging, which requires the services of a separate person or persons. As long as there is any pull or strain on such rope or chain, it must be so held, or else must be made fast. The clutch-winch performs its work very differently. It grips the rope at any part of its length, be the size large or small. It holds the rope against any pull. It pays the rope out slowly, quickly, or instantly releases it. It can be constructed in duplicate, when it will at one and the same time act on two ropes, haul in and pay out, hoist and lower, hold fast both, pay out both, hold fast and pay out, hold fast and haul in. The variety of work it will perform is claimed to be far beyond the capacity of any other hoisting machine, while its action is more controllable. The machine can fill the functions of a number of different hauling de-

vices, and can replace the sprocket-wheel as a means of continuous motion. As an attachment to cranes, it allows of any length of rope or chain, as it does not wind on a drum but lays loosely. Furthermore, as the rope or chain is always the same distance from the center of the clutch-shaft, the power and speed are invariably uniform in regard to the rope and the load.

As an auxiliary to change the hatchway hand-over-hand hoist to a power-hoist, the clutch can be fixed to the ceiling, as shown in Fig. 1. The clutch shaft is furnished with both a tight pulley and a loose pulley, but it can be kept in continuous rotation, as lowering is effected by separating the disks (by counter-motion of cord and nut) which opens the clutch. The guide then takes the position shown by the dotted lines and the hand rope falls in a perpendicular direction, as also shown by the dotted lines, the load descending by gravity being controlled by the check rope. If it is required to lower by power, then an additional fast-pulley with cross belt or other reversing device must be added and the grip kept closed.

We have already indicated that the use for which the machine was first designed was the lowering of boats safely and rapidly. Fig. 4 shows the method of application. It will be seen that, placing each of the falls in a separate clutch, on one shaft, both falls will be paid out simultaneously and equally, lowering the boat with an even keel. Only one man will thus be required to attend in a thorough manner to a duty which now takes several to carry out in an inefficient and uncertain way, especially when disaster calls for immediate action. The wide range of work and variety of form to which the device may be successfully applied is clearly apparent, and considerably enhances the interest, which, even with a more limited capacity, would be attached to it.

Large Furnaces on Alabama Material.

At the Birmingham meeting of the American Institute of Mining Engineers, Fred. W. Gordon, of Philadelphia, read a paper on large furnaces on Alabama material, as illustrated in practice by one of the Ensley furnaces of the Tennessee Coal, Iron and Railway Company. A number of well-known furnace managers took part in the discussion, a revised edition of their remarks being subsequently printed. We may quote the remarks of George Jamme, of the Dayton Coal and Iron Company, Dayton, Tenn:

It is now about one month since the Birmingham meeting of the American Institute of Mining Engineers took place, and the reported success of the Ensley furnaces continues. I see nothing, however, to materially change the opinion expressed by me at the meeting on Mr. Gordon's paper, which appeared to me at that time to be rather a "headquarters-in-the-saddle" sort of bulletin than a convincing and established proof that high and large furnaces are best for Alabama materials. I have too much respect for Mr. Gordon's evident and remarkable abilities, and courage in expressing his conviction, to capriciously criticise his expressed opinions, even had any reverse attended the operations of the two Ensley furnaces now in blast. Any furnace is subject to accident, and in such matters conclusions should not be hasty; therefore, I propose to give my views without reference to the events of the past month's career of the Ensley furnaces, simply on general principles, as I gave them at Birmingham. Mr. Gordon, in introducing our English cousins, and deprecating their action in decapitating their high furnaces, permits a wider range of criticism, and gives an opportunity to correct a prevalent

notion that the ores used in the furnaces of the Birmingham district and the Chattanooga district of the South, are one and the same in composition, and that the fuels used in these districts are also the same. I do not know that Mr. Gordon holds this opinion, but I do know that it is entertained by our cousins abroad and by many of our Northern friends.

Coke.—Judging from what we have seen in the way of coke at the Ensley and Pio-

cause the coke to break across when being pulled and before the coke leaves the oven. The result is a general friability caused by the presence of these slate particles or pieces. This, however, can be remedied, so that Pratt coke need not necessarily be called a "soft" coke, and there is no reason why it cannot be made equal to fair competition with Connellsville coke. It is as low in ash, about as high in carbon, it has the proper ring, is

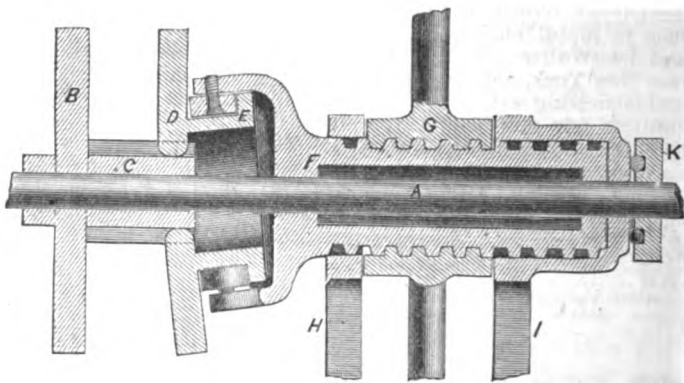


Fig. 2.—Section of Clutch Mechanism.

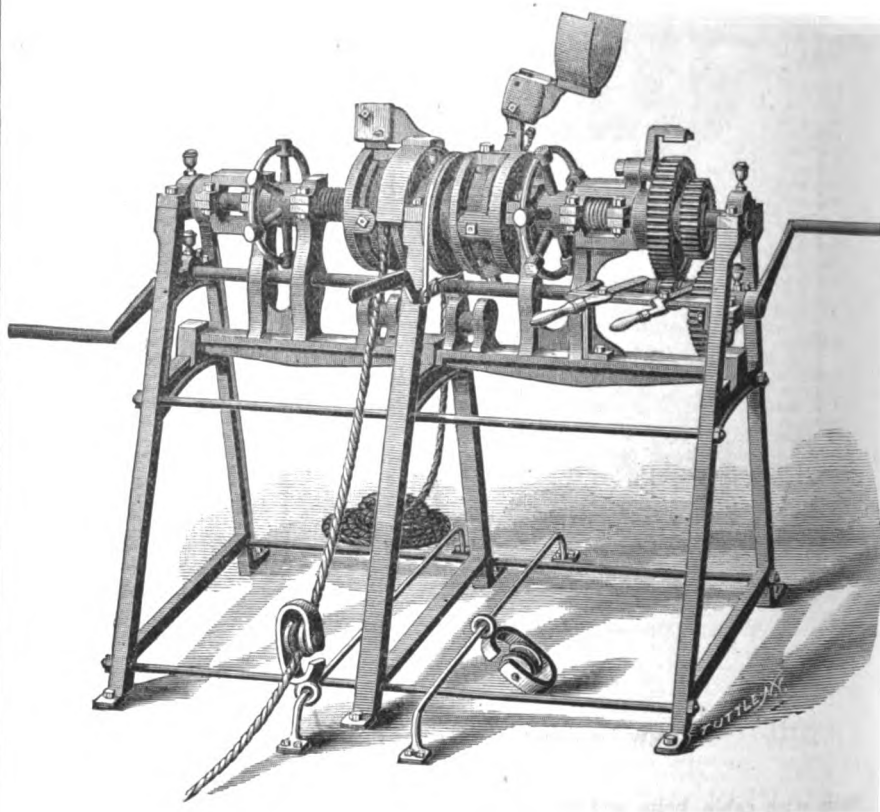


Fig. 3.—Double-Action Clutch Winch.

HOISTING MACHINERY, DESIGNED BY WALTER HART, NEW YORK.

neer furnaces, the coke used in Alabama is not a soft coke, or, if it is, it need not necessarily be so. There are many places on this continent where coke much softer and much more poorly put together is used, and still money is made in the manufacture of pig iron. If the coke at the above-mentioned furnaces is structurally soft, it is due to bad treatment of the coal, either in mining or immediately afterward. It is due to the presence of slate particles, or rather pieces, more or less large, that place themselves across the columnar structure, arrest the action of the incandescent gases in their work, and by their resistance to parting in the columnar direction

equal to Connellsville in cell capacity, and I believe as able to resist crushing test as any Connellsville coke. Washing cannot be used to make it any better, for water is not abundant enough in the South near the Pratt mines to permit that process, and if there is anything in the claim that the Connellsville ash "makes" the Connellsville coke, it may as well be applied to Pratt coke.

In the Chattanooga district the condition of coke is very different. Ash is more abundant. It often rises to 23 per cent. when the miners are careless, and 19 per cent. may be called normal. In this district high and large furnaces have been advocated, but have

not been as successful as was expected, not altogether because of the condition of the coke, but for reasons relating to the ores of the district. The use in them of ores of the Alabama district has not, however, altered the case. Coke made under the same conditions of manufacture as those of the present practice in Alabama and Tennessee would work exactly the same if made of coal from other districts, and with such coke, the dust-catchers, absolutely necessary in Alabama as well as Tennessee, would be required in districts where they are not yet known, to relieve the gorged stomachs of furnaces. With this evil furnace-managers in Southern practice are well acquainted. Without the convenient dust-catchers, the coke would fill the flues with a dust which,

are, by the way, not now ostentatiously exhibited by our good friends in that city. It is quite certain that the large furnaces that have been in operation in Birmingham for several years have not been as successful as the smaller ones, either in freedom from disaster, regular running, or a good quality of metal. With smaller furnaces, and more of them, the risks would be lessened; depressions would be tidied over more easily by a more elastic control of production, and the first cost of erection would not be enhanced in the same degree as the risk and loss of time in recovering from "trouble," which are disproportionately large with furnaces of excessive width of bosh or great height. For instance: Was the Ferryhill furnace, in England, with 103 feet high and 27

good foundry iron. Anything that retards the pace gives time for saturation of the metallic iron with silicon, and is the cause of production of pig-metal with high silicon. Mr. Gordon couples large diameter with height; these assist each other in preparing disasters; rapid driving is accompanied with abundant blast, the section of plastic material is carried higher, and more readily within the reach of increased burden and cooling influences, and less under control than in the smaller furnaces.

Mr. Gordon does not seem to believe in the irregularity of composition of the Southern ores. With more extended actual practice he would have found that they do vary greatly (especially the hard ores) in the amount of lime; and, unfortunately, the difference does not carry with it a corresponding change in the proportion of silica. It is in this respect that I fear the practice of carrying a high percentage of silica in his calculated burden for slag will bring him to grief, or at least those who under his inspiration are in pursuit of large production. I have not had opportunity to obtain an analysis of the pig iron we saw at Ensley, nor has the verdict of the captious customer had time to become known. Even at this time of writing I cannot see yet that the success so far obtained at Ensley is due to the proportions of the furnaces. The South Chicago furnaces, which have been proposed to us as examples of successful running, are not high furnaces in the proportions of the Ensley; and I would ask Mr. Gordon whether the brilliant success at the Chicago furnaces is not due to a proper mode of distribution of stock at the top, rather than to the low percentage of lime, and the special conditions and relations of iron and cinder produced. This mention of the South Chicago furnaces may seem digressive in discussing furnaces working on Alabama materials; yet it is a fair parallel argument. Before ranging myself to Mr. Gordon's opinion that high and large furnaces are best for Alabama materials, I shall require further evidence produced by experience. But I feel quite sure that no one will yield with more grace than I, if any good way can be established to relieve the Southern furnace managers of some of the ills which, in the words of our former president, Mr. Bayles, make their hair turn prematurely gray.

Visitors to the Scandinavian Exhibition, at Copenhagen, Denmark, have been struck with the remarkable electric light-house and its machinery, destined for the Hanstholm, on the west coast of Jutland. This light is about 2,000,000 candle-power, the greatest in the whole of Europe, its range being about 26 miles. With the light is combined a station for powerful fog-horns, or roarers, worked by compressed air. The light is in the exhibition placed on an improved low tower, built of soft limestone, but the tower on the Hanstholm is over 200 feet above the sea level. At the foot of the tower there is the building containing the electric and pneumatic machinery for the light and for the fog-horn. The light has been kept burning every evening since the latter part of August, and the powerful flashes or rays revolving in the sky afford a remarkable sight. The foghorn was not sounded for fear of the tremendous roar annoying the inhabitants of Copenhagen in general, and the visitors to the exhibition more especially.

The Minnesota Iron Company will ship this year by rail and lake fully 450,000 tons of iron ore. The Chandler mine in Minnesota will also ship between 50,000 and 55,000 tons. The total production of the Vermillion range will thus be over half a million tons.

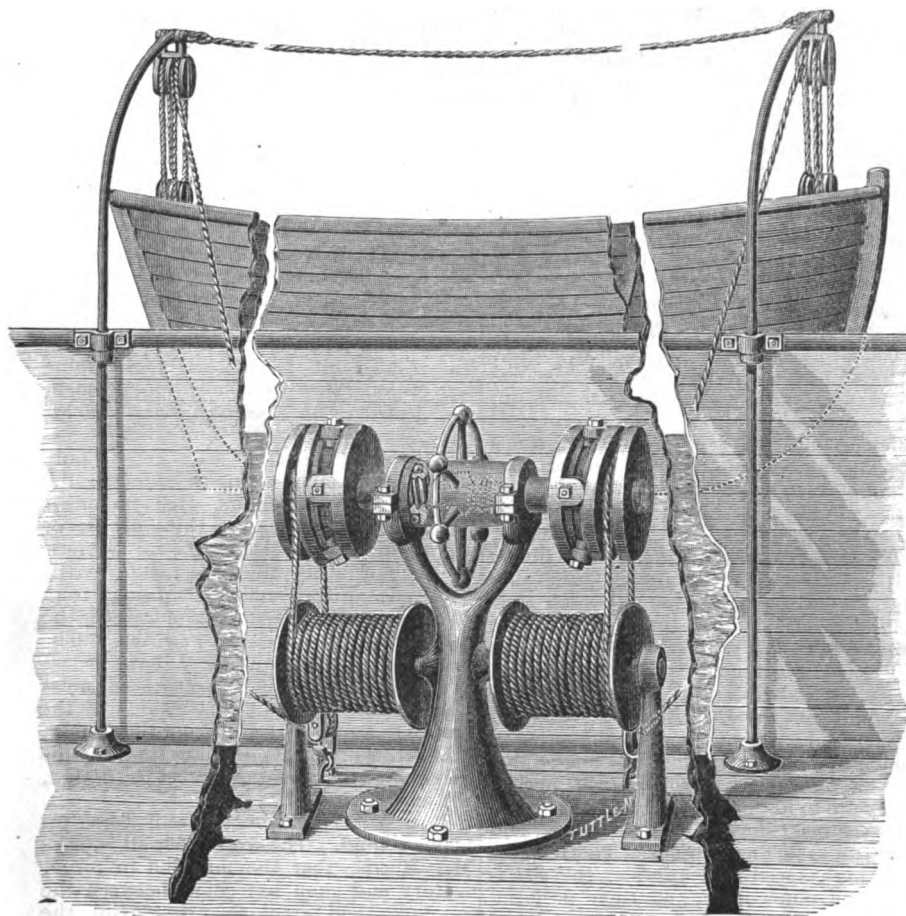


Fig. 4.—Clutch Boat Hoist.

HOISTING MACHINERY, DESIGNED BY WALTER HART, NEW YORK.

moreover, is not found in the South to be as good a fertilizer as the dust found in the flues of Northern or Eastern furnaces.

Plant.—No impartial visitor could find fault with the plant at Ensley, or, in fact, with any of the recently built furnaces in the Birmingham district. When the Ensley plant is complete it will be, without doubt, the finest in the world. Nothing has been spared to endow it with full power in every requisite. The plant is simply "monumental." Is this, however, a criterion of economy? Is it a commercial perfection? I think not. I take it for granted that furnaces are not built, like monuments, to be gazed at and admired. They must have a successful industrial life apart from natural advantages of location; in other words, they must be built to make money, and as much of it as possible—not in a spasmodic manner, or in a steeplechase style, resulting in such wrecks as are to be seen in and around Birmingham, in furnaces that are hardly a decade old, and

feet of bosh a success, as compared with the 80 feet high, and 18 and 20 feet bosh of Middlesboro', both sizes working on similar materials? Height in a furnace, as I think Mr. Gordon will agree, is correlative to the ease of reducibility of the ore in use. Will the large Ensley be as successful in the use of the red fossil ores as the Belgian furnaces are, which use the Minette, and make respectable quantities at a price that even the most enthusiastic real estate agent in Birmingham or Sheffield has not yet dared utter? The Belgian furnaces are not high furnaces; their height reaches only a few feet above the top of the boshes of the Ensley; their stove capacity is very modest; but their low consumption of fuel is remarkable, and may yet be envied by our Ensley friends when they look behind the returns.

In the manufacture of foundry pig (and that is the kind of stuff the Ensley furnaces will have to make) rapid driving becomes an absolute necessity—a *sine qua non* of

The Armington & Sims Engine Works.

In referring to the works at Providence, R. I., of the Armington & Sims Engine Company, which we recently had an opportunity of visiting, we need not specially introduce to our readers the Armington & Sims engine, which, within the past few years, has established for itself so wide and flattering a reputation. This, in fact, was strikingly evidenced by the amount of work with which the shops at present are crowded, everything being worked to its full capacity without apparently much relieving the pressure of business.

The company have been in the buildings which they now occupy, on Eagle street, only for the last six months, the engines having previously been turned out at the works of the Builders' Iron Foundry. There is, accordingly, evidence of newness in some of the shop arrangements, strengthened by the additions which were being made to the facilities for handling and turning out work. The capacity of the works for putting engines on the market is now rated at one engine of 100 horse-power per day, and work is being done constantly on some 200 engines of various sizes and in different stages of completion. Power for the shops is supplied by a 90 horse-power Armington & Sims engine. In the line of heavy tools, our attention was specially attracted by a 10-foot Niles boring mill, and two others of 6 and 7 foot capacity, built by the Pond Machine Tool Company. A large number of interesting special tools, among them milling machines, rotary planers, and a planer of novel design, with stationary table and traveling tool block, built by the Newton Machine Tool Works, of Philadelphia, are used, the character of the work to be done affording a good opportunity for their employment. All the smaller plane surfaces of various parts of the engines are ground, a Brown & Sharpe grinder, and one built by the Springfield Glue and Emery Wheel Company, of Springfield, Mass., being used for the purpose. The work accomplished by them is quickly and cheaply done and eminently satisfactory. In the upper of the several stories of the main building only comparatively light machinery is placed, one of the floors being given up to a nickel-plating plant for plating lubricators and other special fittings for the engines. All these floors receive light from all sides, the building standing alone, and are therefore remarkably cheerful and in striking contrast to the average machine shop. For the economic handling of the heavier parts of work a system of overhead trolleys has been adopted, the conveniences of which are too generally appreciated to require special remark. These trolleys have a lifting capacity of 10 tons, amply sufficient for all requirements. In addition the ground floors are fitted up with tracks and cars, the tracks running through the yard from one building to another in different directions, a number of turn-tables being provided. Heavy pieces of work can thus be readily carried from shop to shop. A 10-ton traveling crane erected in the yard further facilitates this work, and is specially useful in loading the finished engines on trucks for shipment. The crane has been designed by Mr. Pardon Armington and runs with remarkably little friction, a light wind being sufficient to carry it along its track. Every engine before being sent out is tested under steam, a special room being fitted up with testing blocks and other necessary appliances. The drafting rooms and pattern-making department are in a separate building. No heavy foundry work is done, there being only a small brass foundry for turning out composition castings and Babbitt metal. This latter is compounded with great care, so as to suc-

cessfully meet the requirements of high-speed engine running. A small forge is fitted up for light work. The heavy engine castings are turned out under special arrangement outside of the works.

Considerable interest is attached to some of the engines which have more recently been turned out at the works and a number which are now approaching completion. Departing for special purposes from the well-known form of single cylinder automatic which in the past has done such good work, a double cylinder engine was built, the aim being to secure if possible smoother running and great power with compactness. The first engine of this design, we believe, was put into the works of the Pond Machine Tool Company, at Plainfield, N. J., for driving their electric light plant. The engine is of 100 horse-power, and its performance has been highly satisfactory in every respect. The design has been adopted for the electric lighting installations aboard the new cruisers of the navy, and several of the engines have already been turned out. They are rated at 30 horse-power, have 5 x 7 inch cylinders, and run at a speed of 400 revolutions per minute. The cranks are set 180° apart, so that a practically perfect balance of the moving parts is obtained. Both valves are worked by one valve stem, but in all other respects the details are similar to those of the single engine. The engines are coupled to the dynamos either by flexible couplings or by gearing. A striking novelty is found in the compound condensing engines which the works are now building on special order from the Government. They are intended for the ordnance shops at Washington, and are arranged for rope driving, each engine having two sheaves. The cylinders are placed side by side, and have diameters of 10½ and 16½ inches, with 12-inch stroke. The engines will run with 220 pounds boiler pressure, and at a speed of 275 revolutions, at which they will average 100 horse-power each. The cranks here also are set 180° apart with the same advantage of perfectly balanced parts. Five engines of this design will be built for the Government. A set of engines, 12 in number, which are in course of construction for the Philadelphia Edison Company also deserve notice. They are to develop 440 horse-power each, or over 5000 horse-power altogether, and will run at 230 revolutions. The remarkably high speed for engines of this size is specially noteworthy, and their performance when completed may well be watched with interest. Eclipsing all previous engines, however, so far as speed is concerned, will be the engines designed for working the electric search lights which are to be fitted up in the bows of the new cruisers of the navy. Great compactness, coupled with the requisite power, is there an element of considerable importance, and will, we think, be secured in a very marked degree in these engines for which patterns are now being made. They will embody the main features of the regular Armington & Sims engine, but will have two double-acting vertical 3 x 5-inch cylinders, and are to run at a speed of 800 revolutions per minute, at which they will develop 20 horse-power. Mr. Armington has in contemplation, also, a 200 horse-power double compound tandem engine, which, in the event of being designed, would probably be put on the market as a regular engine for general manufacturing purposes. The activity in all departments at the works will perhaps be better realized when it is stated that the company are at present 87 engines behind their orders.

Prof. Edward Orton, State Geologist, has made a measurement of the monster gas well drilled at Findlay lately and computes the yield at 31,600,000 cubic feet per

diem. This is more than two and a half times as large as the famous Karg, which was computed at 12,000,000 daily. The well is thus proven the largest in that section, if not in the world. It is owned by the Syndicate Oil and Fuel Company of Findlay, Ohio, a rival of the Standard. The well is 1200 feet deep and 60 feet in the Trenton rock. It gave scarcely any gas when drilled in, but on being torpedoed it responded with a vast flow. The well is now being tubed and packed and the gas will be shut in for use.

Labor-Saving Machinery.

From the current number of the *Fortnightly Review* William Morris, poet and artist, sends out over the roofs of the world a quiet and exceedingly bitter cry against the deteriorating effects upon society of labor-saving machinery. The Philadelphia *Ledger* summarizes his views and comments on them. The artisan, Morris holds, no longer has in his work the pleasure which he once enjoyed of individual creation, of making it the expression of his own individual taste and skill; having lost that, he has lost the inciting cause of happiness which his daily labor should give him, and he finds his vocation dull and cheerless. The man has become a mere part of the machine; he is not greater, but less than it; he is not elevated, but cast down by it. To the skilled, ambitious handicraftsman, losing his creative skill, the labor-saving machine has become the great invading Moloch, the destroyer of his originality and his taste.

But the maker of things is not the only sufferer from labor-saving machinery; the buyer of them also suffers. He is no longer permitted to purchase a thing of use or show which is in itself unique; he must buy one of many all alike, made by the hundreds or thousands, or millions from the same pattern, wrought out upon the same lines by the same machine. The man who wishes to wear a hat of last year's fashion cannot do so; he must wear the one of this year's fashion, as the machines are no longer making the former. His furniture must be like that of his neighbors; the machine decrees the design, the execution of it.

But, bad as this begins, still worse remains behind. The worst of it all is, says Mr. Morris, that the machine in forge, factory and shop has come between the employer and employed, destroying the old close and friendly relations between them there, separating them by a wide, deep, impassable gulf of divergent interests. The employers are a class of "slaveholders," the employed, "slaves." The machine breeds discontent among the workingmen; it makes Socialists, Communists, dangerous classes of them.

In all this lament of the poet, artist and Socialist, for Mr. Morris of late years has become a noted teacher of the creed of Socialism and a great leader in its ranks, there is that one grain of regretful truth which gives excuse for its being made. But from even the poet's, artist's, and especially from the Socialist's point of view, if the latter is, as he maintains, a well-wisher and helper of humanity, there is a good deal to be said in favor of the labor-saving machine. It is not, as Mr. Morris now contends, and as thousands before him have erroneously contended, an unmixed evil.

Admitting that it has interfered with individual invention and skill, and made artisans fewer and workmen more numerous; that it has multiplied bad or indifferent designs of things, and so dwarfed original creations and crushed out the myriad forms of beauty which would have grown from under the hands of hosts of skilled workers, must it not also be ad-

mitted that it has given of such taste and beauty as it produces to millions where handicraft gave only to the favored few, the wealthy? And if it has reduced the number of artisans and increased the number of poor workmen, has it not given to both those classes a prosperity undreamed of by the old handicraftsman? Compare the state of the workman of these days of the labor-saving machine with that of his predecessors; look into his home filled with many comforts which formerly would have been considered luxuries by all but the very rich; look at his well-housed, well-fed, well-clothed family; look at his wage rate, at his savings in bank and building association, and compare his condition with that of those who before him wrought 12, often 14 hours per diem with their hand tools. The homes of the workmen of to-day are infinitely more tastefully furnished than were those of the fairly well-to-do before the machine was brought into factory and shop. And as for the rich, are their homes less beautiful or artistic than those

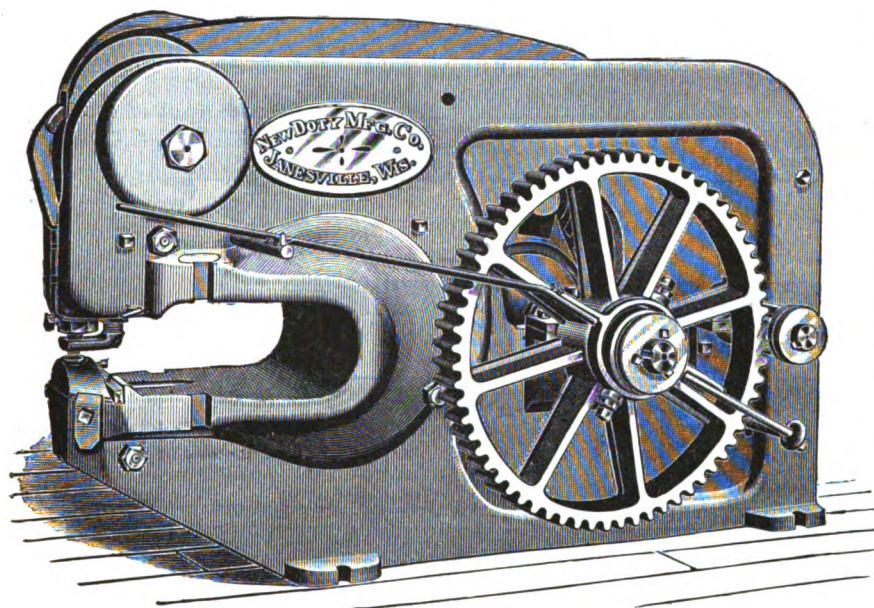
showed that the operatives of them earned an average of \$126, gold, more in 1884 than in 1830. In this last mentioned year the hours of labor were 14, in the former mentioned year they were 10, so that the wages of 1884 per hour, as compared with those of 1830, were double. Further, said Mr. Atkinson, "Skillful female weavers earn more now than male overseers and second hands earned in 1830." In 1817 the average wages of skilled artisans in New York City, where they were as high as anywhere, were \$9 per week, and a working day was 12 hours long.

It is not only in this country that the wages of the workman have increased and his hours of labor decreased since labor-saving machinery came into common use; the same conditions have prevailed everywhere, though not to so great a degree. The machine has undoubtedly dwarfed or killed some of the genius or talent of individual craftsmen; but, considered in respect of all its influences, it has not left the world worse, but better, for its coming. The

Mr. Swank will be potential with the powers at Washington. In providing the sinews of war which gave Chairman Quay the opportunity to put his plans into successful operation, the iron trade of Pennsylvania was most liberal, and this was brought about largely through Mr. Swank's efforts. The importance and efficiency of his services in distributing the tariff tracts broadcast through the States are recognized by the interests represented, and the feeling is that too much cannot be done in acknowledgment. In addition to recommending his appointment to a suitable position under the Government, there is talk of the manufacturers making a personal testimonial of their appreciation in the presentation to Mr. Swank of a \$10,000 house.

New Belt Power Punch.

We show on this page an engraving of a new belt power punch made by the New Doty Mfg. Company, of Janesville, Wis., for the use of boiler-makers and sheet-iron workers generally. The punches are built from new patterns in the different sizes, ranging in weight from 150 to 8000 pounds. The smallest one will punch a $\frac{1}{4}$ -inch hole in $\frac{1}{4}$ -inch iron or its equivalent to the center of 4 inches, and the largest will punch a 1-inch hole in $\frac{1}{4}$ -inch iron or its equivalent to the center of 74 inches. These machines are strong and well proportioned. All shafts, bolts and plungers are of steel, and every machine is fitted with an improved stripper, which can be adjusted to the $\frac{1}{16}$ part of an inch. The deeper jawed machines are provided with links, and when these are adjusted the machines will do still heavier work. The machines all have tight and loose pulleys and start and stop with a clutch worked by a lever. They can be started and stopped instantly, thus holding the punch at any desired point. The distance from the center of punch to the front of machines is but $\frac{1}{4}$ inch, thus enabling the operator to punch flanges.



NEW BELT POWER PUNCH, BUILT BY THE NEW DOTY MFG. CO.,
JANESVILLE, WIS.

of their elders? Never before in the life of the world was art so common in the designing and making of all things as now, and never before was the artistic feeling so great or so generally shared. Art in even the surroundings of life belongs now to the multitude, where once it belonged to the few.

As a Socialist Mr. Morris would have the great masses of those who labor for their daily bread lifted up out of vice, ignorance and dire poverty. He would make them all prosperous, contented, happy. In 1800 wheat was a dollar a bushel, and the average wage rate \$1 a day. Put the two facts together and it will be seen that it then took a whole week's wages—yes, more—to buy a barrel of flour. Until the recent increase of the price of flour, caused by the partial wheat failure of this year, a barrel of excellent flour could be bought for \$5, the very highest fancy grade for \$6, or for, at the most, the wage for three days' work.

One of the best authorities on economical questions in this country is Mr. Edward Atkinson, of Massachusetts. In the elaborate paper read by him in 1884, at Montreal, before the British Association for the Advancement of Science, he exhibited the great increase of wages which had occurred in this country since 1830. Taking two cotton mills as examples, he

machine has not only cheapened homes, food, clothing and fuel to the entire body of consumers, but it has made of the great farming class a richer class. It has taken thousands or hundreds of thousands of men from the mines, shops and forges and made farmers of them. Farming pays chiefly because of the labor-saving machine, of that which makes the implements of the farm and of that which transports the products of the farm to market. The labor-saving machine has added to the hosts of consumers, has created a demand from millions for such things as were once bought only by the rich, and, though it has wrought evil in some ways, it has wrought infinite good in others. If it has hurt labor in some ways, it has helped it in others, and, by making the lives of men and women more prosperous, it has made them happier.

We find the following in the Philadelphia Press: From the talk among influential Republicans in the iron trade it would appear that James M. Swank, manager of the American Iron and Steel Association, stands a much better chance of securing substantial recognition from the incoming Federal Administration than many of those being boomed for office by the political leaders. The influence back of

The famous Cockerill Company, of Belgium, made a gross profit in the last year of 2,927,740 francs, against 2,395,420 francs the previous year. For a dividend of 50 francs per share and for writing off for depreciation 828,729 were needed, and 464,443 francs were paid for loss in building two unserviceable steamers on the Ostend-Dover line. The company employ 8800 men, to whom 8,863,997 francs in wages were paid.

Prof. Hanford Henderson, of the Department of Chemistry and Physics at the Philadelphia Manual Training School, has just issued in pamphlet form his lecture on "Aluminium," which was delivered early this year before the Franklin Institute. The importance which has always been attached to the production of cheap aluminium makes the subject one of special interest at the present time, and the lecture will be found very profitable reading. Professor Henderson briefly reviews the investigations of some of the earlier scientists, such as Lavoisier, Sir Humphrey Davy, Oersted and others, and then describes the method of preparing metallic aluminium originated by Deville, and which, as may not be unknown, is the method in practice at the great French establishment at Salindres. It is now the sole source of the metal in France and England, and has more recently been so greatly improved that unless some exceedingly advantageous method of reduction is proposed it promises to remain the ruling process. The improvements brought out by Mr. H. Y. Castner, of New York, are also dwelt upon, as well as the Cowles process.

Registering Scale-Beam Attachment.

The fact that where large amounts of any kind of material are being weighed mistakes in recording the weights are very apt to be made, has prompted Messrs. Borden, Selleck & Co., 48-50 Lake street, Chicago, Ill., to bring out the scale-beam attachment which we show on this page. The nature of the arrangement, we think, will be readily understood.

The shelf A receives an electrotpe of raised figures, which correspond exactly in location with the divisions and graduation on the beam—in other words, if the poise C rested in the notch representing 40,000 pounds in weight a striking bar, B, attached to it will come immediately over 40,000 in raised figures on the support A. Hence, if the striker B receives a sharp blow at D it will bring the striker B D in contact with the raised figures 40,000, and this will be printed on a card that is placed between the striker and the figures. The long beam is gradu-

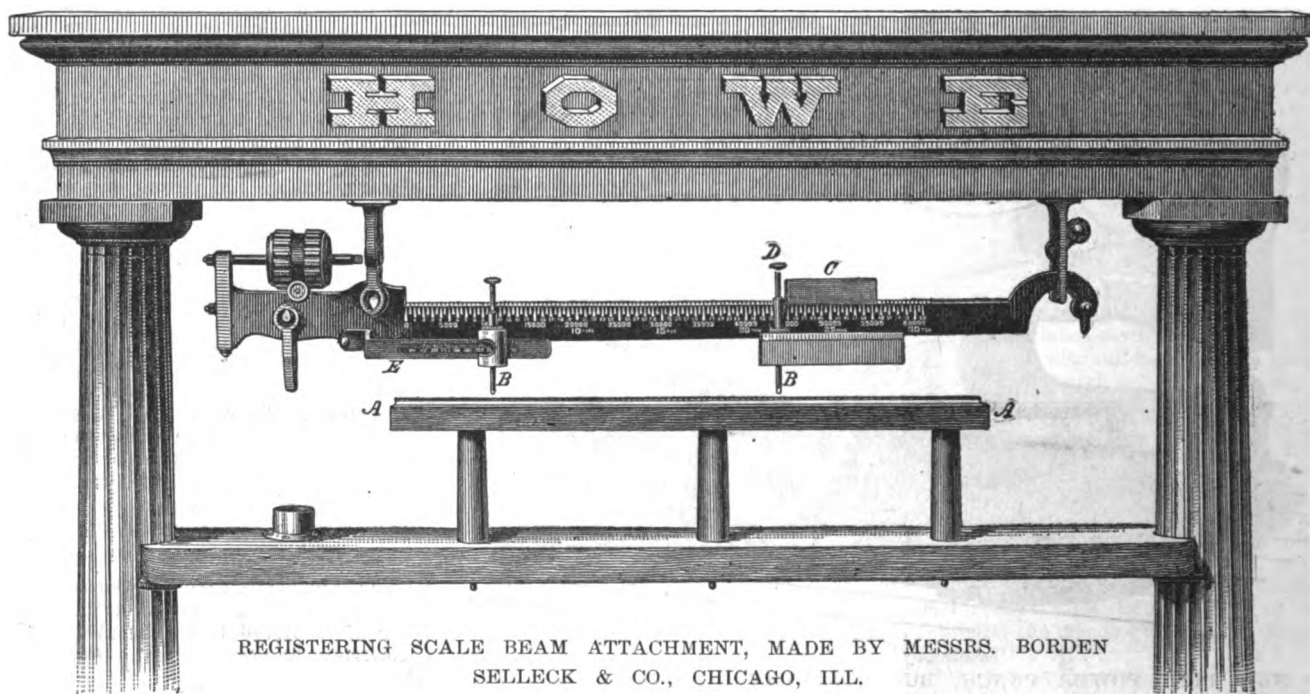
gether, we may snip the edge of one or two of the thicknesses, but the piece cannot then be torn across. With steel the case is different. It is true that in the present day we hear very little indeed of mysterious steel failures, but it must not be forgotten that immunity has been purchased by the sacrifice of much initial strength.

The Benardos Electric Welding Process.

The process of welding invented by Mr. N. V. Benardos, of Petersburg, consists in laying the pieces of metals to be united on one another with the welding seam spread with chips of the same metal, to form the negative electrode of a voltaic arc. The circuit occurs through an iron table upon which they lie, and which is connected with one pole of the source of electricity. A carbon, depending in size on the strength of the current as well as upon the hardness of the metals to be welded, is placed in

Regenerative Gas Engines.

The next step in the direction of increased economy of fuel in gas engines will, according to the London *Engineer*, most probably be the utilization of the waste heat of the exhausted gases. The other important sources of loss—viz., radiation and absorption of heat by the water-jacket—may be regarded as unavoidable with motors of the present prevailing types. Engines have no doubt been proposed which dispense with the water-jacket altogether, but there seems to be little probability of such machines coming into extended practical use. It is also significant that the most successful gas-engine builders appear to regard the method of external refrigeration as a necessary evil, and make no serious attempt to do away with it. Putting aside, then, the losses due to radiation and conduction, amounting in all to about 66 per cent., we have about 17 per cent. of the total heat of combustion converted into available power,



REGISTERING SCALE BEAM ATTACHMENT, MADE BY MESSRS. BORDEN
SELLECK & CO., CHICAGO, ILL.

ated to 500 pounds, and the least amount that can therefore be weighed on that beam is 500 pounds, while the small beam E is graduated with 500 pounds, 20 pounds at a time, it, of course, becomes necessary to add the weights at the two different points to get the exact weight. The engraving represents a railroad track scale-beam, and they are never graduated finer than we have stated above. The same principle can be applied to any style of scales where the graduations may run to pounds or half-pounds, but on the railroad track scales 20 pounds is as close as it is cared to go. The raised type on the shelf A has a type-writer ribbon stretched lengthways. It is evident that weights taken in this way will prevent the many mistakes that occur from careless reading of the weight indicated on the beam, from an incorrect record in the weigh book, &c.

The reason why a comparatively large crack in an iron-plate is by no means so injurious as a very small one in a steel plate, lies in the fact that the iron is not homogeneous. It consists, so to speak, of a number of separate layers pasted together with cinder. Unless the crack extends through all the layers to the same depth, rending cannot well be initiated. If, for example, we take half a dozen thicknesses of calico and cement them to-

an insulated holder connected by a cable to the other pole and forms the positive electrode. This is passed to and fro over the seam by a workman who protects his hand from sparks by a leather glove and his eyes by a dark glass screen fastened to the carbon holder. As soon as the workman brings the carbon to the proper distance from the seam the electric current leaps from pole to pole with a strong hissing, and melts very rapidly the chips and edges of the metal bars, which are united when cooled. This process should be called rather soldering than welding, for in welding the heated metals are united by mechanical working, while in soldering a third metal is used to cement the other two together. One thing is to be noted—the metal in the weld has had its condition changed from a fibrous to a crystalline structure, which is evidently due to the complete fusing of a metal afterward rapidly cooled. The tensile strength at the weld is considerably decreased, as records of a few tests seem to indicate.

The new rail mill of the Allegheny Bessemer Steel Company will be ready to start up, so it is stated, in January. While not as large as the Edgar Thomson Works, it will be one of the most complete mills in the country, and will have all the latest improvements and appliances.

while an almost equal quantity of heat passes away in the exhaust gases without performing any duty. In the Atkinson cycle engine the quantity of heat carried off by the jacket is only about 19 per cent., the heat converted into work is nearly 20 per cent., and the heat carried off by exhaust is over 50 per cent. In gas engines of good construction the escaping gases have a temperature of about 500° C., and, if we assume the maximum temperature to be 1500° C., the theoretical efficiency would be 0.56. Now, if we suppose the temperature of the exhaust gases to be usefully lowered to, say, 140° C. with the same initial temperature, the theoretical efficiency would rise to 0.76, with a corresponding gain in actual efficiency. It is not practicable to reduce the final temperature by further expansion of the gases in the cylinder, so that some form of regeneration affords the only means of a closer approximation to the conditions of maximum efficiency.

The employment of regenerators with engines using town's gas is, for obvious reasons, out of the question; but for the rapidly increasing number of motors burning producer gas, the application of the regenerative system must lead to a large saving of fuel. Atkinson and Otto engines working with Dowson gas are at present using less than 1.5 pounds of coal per indicated horse-

power per hour, as certified by their users, who can have no reason for understating their fuel consumption. In some cases it is said to be as low as 1.1 pound; and it may be safely assumed that gas motors using generator gas can be worked with an hourly consumption of 1.25 pounds of coal per horse-power—particularly if the engines are specially designed for burning generator gas—as ordinary engines have features which, though advantageous when

tion, as the temperature of the exhaust gases is low enough to permit the use of continuous conducting regenerators. Gas generators working with cold air use about 5 per cent. by weight of steam with the air blast; and the percentage of combustible in the gas averages 40 per cent., with over 50 per cent. of nitrogen. A hot-air supply drawn from a regenerator would insure the decomposition of a larger proportion of steam, thus enriching the gas

Resolve to stop mining under existing circumstances on the first day of December, 1888, for an indefinite period; provided that any coal required in the flat trade for this city or between here and Parkersburg shall not be affected by this resolution.

After the meeting, a number of the operators stated that the production and shipment of coal has been so great this season that the markets have become completely gutted and prices too low to afford any profit. This is the first time that the iron operators have been compelled to suspend mining on account of overproduction.

The Davis Bench Dog and Clamp.

We show on this page engravings of a new form of bench dog and clamp brought out by F. N. Gove, 16 Exchange Place, N. Y. It is of simple and substantial construction, and will be found useful in a variety of ways. Fig. 2 represents the device in position on a bench, holding a board, while Fig. 1 shows rear views of the clamping mechanism. It will, no doubt, be readily understood that the two grooved projections on each dog, which resemble screws, one of them being movable laterally, are slipped into two adjoining holes in the side of the bench at approximately the desired distance apart. Pushing down the end levers then brings into operation a cam on each of their ends, which acts on the movable projection, causing the dog to firmly grip the bench. The clamp adjustment is easily and quickly made, the clamp, as shown in the upper of the two cuts, marked Fig. 1, having a lateral travel of several inches. It also is firmly clamped by pressing down a lever. This, by means of a toggle action, causes the

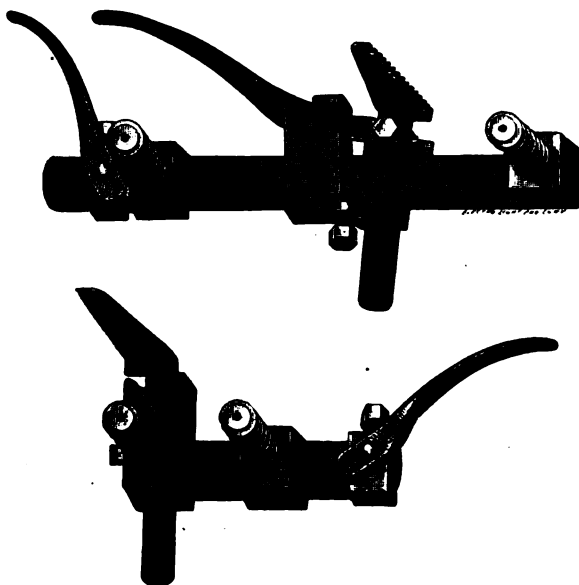


Fig. 1.—Clamping Mechanism.

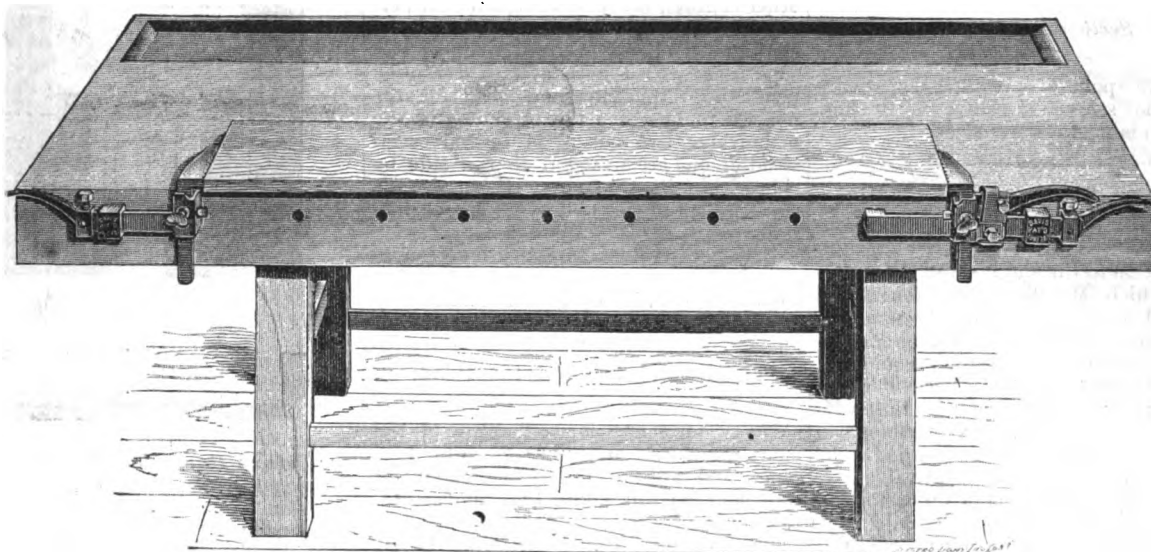


Fig. 2.—General View of Device in Working Position.

THE DAVIS BENCH DOG AND CLAMP, MADE BY F. N. GOVE, N. Y.

gas of high calorific power is used, lead to considerable loss when fuel gas is substituted. Rankine estimated that 90 per cent. of the heat in the exhaust of air engines might be retained for use by means of a regenerator. If we suppose, in the case of a gas engine working in near proximity to the producer or generator, that 75 per cent. of the exhaust heat could be returned to the producer by means of a suitable regenerator, the fuel consumption would be reduced to less than 1 pound per indicated horse-power per hour—a result certainly worth striving for. The regenerative apparatus required is simple and inexpensive, and would require practically no atten-

and reducing the volume of useless nitrogen.

Monongahela Coal Mines.—At a meeting of the Monongahela Valley Coal Shippers, held in Pittsburgh on Monday, the 19th inst., the following resolution was adopted:

Whereas, The unprecedented continuation of water for shipping coal has so overstocked the market that it is impossible for us to make sales at any prices; and,

Whereas, The landings at Cincinnati and Louisville are filled up to their utmost capacity, and in the event of severe freezing weather or extreme high water, there would certainly be immense loss. We, therefore,

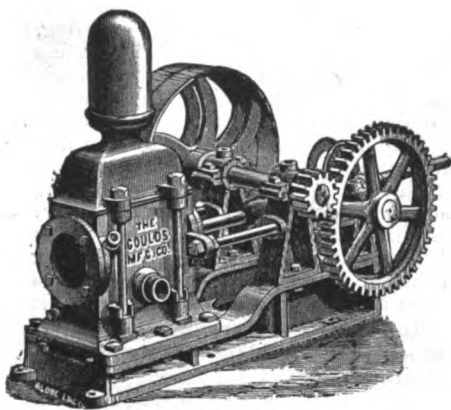
serrated clamp proper to slightly move both forward and downward sufficient to securely hold the board. The set screw shown at the bottom is for the purpose of taking up wear on the bar along which the clamp fixture is moved. The serrated clamps are capable of being set at different heights, set screws holding them in place.

Referring to the matter of great weights on locomotive driving wheels, it is interesting to note that in the Swinerton polygon-driver locomotive, now running on the Boston and Lowell road, and which a short time ago was so much talked about,

a weight of 19 tons is borne by the single pair of drivers. The damaging effect of this excessive weight on the permanent way will no doubt soon become apparent. Incidentally we may repeat that the polygonal feature of the drivers has not proved a success. The 210 faces milled on the wheel treads soon disappear after running, and the engine is therefore virtually a locomotive with a single pair of ordinary drivers.

New Suction and Force Pump.

The Goulds Mfg. Company, of Seneca Falls, N. Y., are bringing out the new suction and force pump, shown in the annexed engraving. It is mounted on a strong iron frame, with gearing, tight and loose pulleys, &c., and is adapted for feeding boilers or working in any place or capacity under heavy pressure. The pump is geared 4 to 1, and for continuous service the pulley shaft may be run between 140 to 160 revolutions per minute, and



New Suction and Force Pump.

against 75 pounds pressure per square inch. The stroke measures $4\frac{1}{2}$ inches. The pump is made in five sizes.

The New Sturtevant Automatic Engine.

In addition to the single-valve automatic engine which Mr. B. F. Sturtevant, of Boston, Mass., brought out about a year and a half ago, he is now building engines with independent expansion valves and separate outboard pedestals. The older design, it may be remembered, was self-contained. The most marked characteristic is in the novel and peculiar form and combination of the main and cut-off valves.

The passages in the main valve, for the admission of steam to the cylinder, do not extend through the entire thickness of the valve, as is usually the case when a riding valve is used, but resemble the exhaust cups, except that they are only as wide as the ports in the cylinder. Within the thickness of the main valve is a cylindrical seat, in which runs a cut-off piston valve, which receives from the variable cut-off eccentric a differential movement relatively to that of the main valve, such that it is withdrawn just before the beginning of the stroke, opening the passage through the main valve into the cylinder. The piston-valve returns, at the dictation of the governor, to close the passage and cut off the steam. As at this time the two valves are moving in opposite directions, this action is almost instantaneous. This particular form of cut-off valve, having very little motion in its seat and being subject to no lateral pressure, has very little wear. Even were there a little leakage after continued service, it would cause but very slight loss. It could only take place during expansion, before the

closing of the port by the lap of the main valve—that is, only in the earlier stages of expansion, when the difference between cylinder and chest pressure is slight, and even then this leak would be only into the cylinder and never into the exhaust. The main valve is set to cut off at three-quarters stroke; but, obviously, such cut-off is usually of no effect, for the cut-off valve is expected, for economical running, to act before the half-stroke is completed. The main valve is carefully balanced by pressure plates upon its back, so that the power required to move it is reduced to a minimum.

The cut-off valve stem passes through the tubular stem of the main valve, which is fitted with a stuffing-box at its outer end. Perfect alignment and freedom from wear are secured by guiding the stems by a small cross-head attached to the main stem.

Supported by four studs upon the arms of the governor pulley are four weights, co-operating by their centrifugal force to compress two long and powerful springs. The cut-off eccentric is pivoted to the hub of the governor and is so connected with this system of weights and springs that the action of the weights swings it across the shaft regulating the cut-off, but in no way affecting the admission, exhaust and compression, which are controlled by the main valve. The heavy weights, the stiff springs and the balanced frictionless valve combine to make the governor very sensitive to the least change in the load and speed. Too sudden action on its part is prevented by a dash-pot connected with the system of weights and springs. The points of admission, exhaust and compression being in no way affected by load or speed, and the only duty of the piston valve being to cut off the steam, the effects of change of load or speed, so evident in other engines, are not, it is claimed, perceptible upon the cards from this class of engines. The largest size engines of this type are provided with a fly-wheel independent of the governor, and, for the purpose of lessening the thickness of the main valve, two cut-off piston valves instead of one are arranged to run side by side within its thickness. Otherwise the construction of the two types is substantially the same.

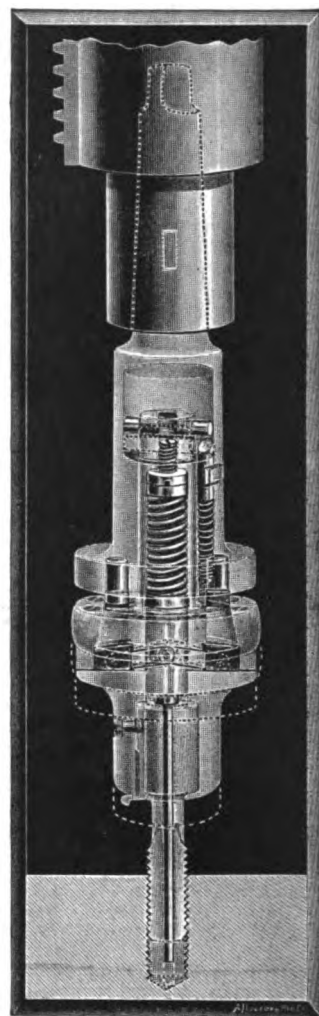
It is not without interest to note here also that Mr. Sturtevant is now building small single-valve upright automatic engines.

The Leland Tap Driving Head.

Every mechanic is well aware of the many difficulties attending machine tapping, and also of the great amount of time consumed in doing the same operation by hand.

The Leland Patent Driving Head, brought out by the Hampden Tool Company, of Holyoke, Mass., is designed to solve these difficulties, combining also great speed with accuracy. One of these machines, it is claimed, is capable of doing the work of five or six men in shops where it is in operation, and giving excellent satisfaction. The machine is made in but one size, covering the whole field from $\frac{1}{4}$ inch to $1\frac{1}{4}$ inch inclusive, without any adjustment from one size to another. Ordinarily the attachment will be used in upright drill or screw machines which have right and left belts for going ahead or reversing at will. The annexed cut explains the construction. In operating the upper member is lowered until its driving lugs come in contact with those of the lower member, which are on a clutch ring, driven by being thrust into its tapered seat by two wedges. These are actuated by a toggle joint operated by a spring, as shown. The tap, with its spindle projecting top and bottom, is held

by a spring gib, allowing an easy change from one size to another. As the bottom of the hole is approached, the tap spindle moves up, taking with it the guiding bar for the toggle joint, thus drawing in the wedges and allowing the clutch ring to drop off its seat and pass around freely. This permits the lower member to come to rest while the machine still goes ahead. The driving clutch is now thrown out by virtue of the tap spindle being at the bottom of the hole. For reversing the cross head of the drill or other driving machine is raised until the pin passing through the shank of the lower member drops to its seat in the chamber of the upper member and comes in contact with the side reversing pin. The driving machine having been



Tap-Driving Head, Made by the Hampden Tool Co., Holyoke, Mass.

reversed, the tap is withdrawn from the hole. The full lines in the engraving show the driving position of the details, and the dotted lines show the tapping position when at the bottom of hole.

According to one of our German exchanges, a new process has been brought out in Vienna of turning out copper-coated steel wire for electrical purposes. The old method was galvanic, while, according to the one now proposed, the steel wire will be coated by spirally winding around it very thin copper bands. We need perhaps not specially point out that the object in all such wires is to combine the great conducting power of the copper with the tenacity of the steel.

It is feared that the death of Dr. Hostetter will necessitate the reorganizing of the South Pennsylvania Railroad, of which he was one of the leading men. His estate is valued at \$14,000,000.

THE WEEK.

The Standard Oil magnates are now said to aspire to a complete control of the natural gas interests of the great manufacturing center comprised in Western Pennsylvania, Ohio and West Virginia. A Pittsburgh stock broker is quoted as saying: "The Standard people saw what a big thing there was in gas, and have gone quietly along absorbing millions of acres of gas lines, and the gas companies will wake up some fine morning to find their supply of gas utterly inadequate, their lands all drilled, and the Standard Oil Company ready to purchase their stock or furnish them gas at their own terms. In addition to this they practically own the Ohio oil field, and will be prepared some day to make more gas than the world can burn." The \$11,000,000 of dividend-paying stock represented by a Philadelphia company is supposed to be looked upon as a tempting morsel.

Goldwin Smith, at the recent banquet of the New York Chamber of Commerce, expatiated freely upon the promised advantages of commercial union with Canada, but so long as the leaders of the two great political parties in the United States are not disposed to favor the project apart from political union discussion is idle.

About half of the land west of Central Park, New York, owned by the late Joshua Jones, was sold at auction last week by the executors of the estate and brought about \$2,000,000. The property was bought by Mr. Jones' father in 1808 for less than \$3000.

A plan is under consideration by the Southwestern roads to regulate traffic in the interest of security holders as well as in that of shippers. It is proposed to run all competitive business through a clearing house, the supervision of which shall be in the hands of persons outside of the management of any one of the companies. An important detail of this plan is that no president shall be allowed to act independently of the majority of the board of control without the authority of his directors.

Despite the alarming war rumors lately flying in Europe the speech of the Emperor at the opening of the German Reichstag was extremely pacific and without allusion to military credits.

The industrial exposition at Richmond, Va., during seven weeks was visited by 500,000 people, freight tonnage on the railroads meanwhile almost doubled; bank clearances in October increased nearly \$2,500,000 as compared with the same month in 1887, and it is claimed that the Richmond exposition not only cleared expenses, but will yield a handsome dividend to the stockholders.

United States Treasurer Hyatt, in his annual report, just completed, states that the surplus available for the reduction of the public debt at the close of the fiscal year was \$111,000,000, an increase of \$8,000,000 over the year before. During the year the net Treasury balance increased about \$60,000,000, due to an increase of \$37,000,000 in the assets and a diminution of \$23,000,000 in the liabilities. The net decrease of the principal of the interest-bearing debt during the year was \$75,000,000. Of this amount \$51,484,000 in bonds were purchased for the sinking fund, and for the precious privilege of paying this debt before it was due the taxpayers were obliged to give \$8,274,000. The silver coinage during the year yielded \$32,484,000, almost every dollar of which went into the Treasury vault. The Treasurer is of the opinion that the people have all the silver dollars they want or are willing to take,

and recommends that if the purchases of silver are to continue the bullion be put into forms of heavy bars or ingots, arguing that the present supply of the dollars will be sufficient for any demand there is likely to be for them; and that any increase of the certificate circulation could be based with perfect safety on the uncoined metal.

A contract signed last week by the Canadian Minister of Railways, at Ottawa, indicates that the engineers' plans of the proposed Chignecto Marine Railway, to connect the Bay of Fundy with the Straits of Northumberland, are to be immediately put in course of construction. The estimated cost of the work is \$5,500,000, and it will be finished in the autumn of 1890. A dock is to be constructed at each end for the reception of vessels before they are transferred to the railway. That at the Bay of Fundy will be 600 x 300 feet, and that at Chignecto is to be 800 feet long, in addition to which there will be a lifting dock 200 feet long. At the Bay of Fundy terminus there will be a hydraulic lift which will lift and lower vessels 40 feet. Opinions in Canada differ in regard to the necessity for a work necessarily so expensive.

Governor Church, of Dakota, in his annual report, estimates the present population of the Territory at more than 700,000, including Indians.

Not deterred by the seizure of the steamer Haytian Republic by a Haytian man-of-war, two more steamships suspected of carrying arms to the insurgents have been permitted to sail from New York, the Collector being without evidence sufficient to warrant their detention. The United States cannot be held responsible for the ultimate destination of arms or ammunition that may be landed within the jurisdiction of the Dominican Government.

It is understood that the new 5000-ton steamship for the Pacific Mail Steamship Company, just put under contract in England, is intended to run between San Francisco and China as successor to the City of Tokio, an American-built steamer recently lost.

The Sioux City bridge has been completed, at a cost of \$1,250,000, opening a direct route from Northwestern Nebraska, Dakota and Wyoming points to Chicago and the East.

John W. Keely, of "Keely motor" fame, was recently consigned to a prison cell for contempt of court in failing to produce the plans, specifications and general working model of his motor, as ordered by the court on September 1, but soon released.

The latest scheme for the relief of Ireland is a land purchase bill favored by the Government, who propose to advance the necessary capital. The impracticability of the measure appears from the fact that tenants in arrears cannot be purchasers. Hence, they are offered advantages which they are in no position to accept. The bill, therefore, in its practical workings could be little better than a new method of evicting tenants from their holdings.

A syndicate of New York capitalists have obtained from the Dominican Government a concession for a railroad from San Domingo City to Azua, a distance of about 100 miles, covering a subsidy of about \$2000 per mile, besides grants of valuable timber lands comprising dyewoods and mahogany.

A number of merchants and shipowners in this city doing business with Haytian ports have addressed a petition to the State Department requesting Secretary Bayard not to recognize the blockade maintained by General Légitime in Cape Haytien, Port au Paix, Gonaives and St. Marc, as they

had large business interests in those ports. Moreover, General Légitime had not been duly elected President of the island of Hayti.

The enormous water-power of the Lachine rapids is to be utilized by an American company with the object of lighting the city of Montreal by electricity.

The Canadian Pacific Railroad has made arrangements to run trains into Chicago, so as to share in the transportation business between that point and New York.

Most of the cars on the North Side and Atlantic divisions of the Long Island road have been fitted out with apparatus for steam heating from the engines. The New Haven road is experimenting with various systems. The New York roads are all getting ready to abolish stoves.

Speculative contracts are legal, as decided by the Supreme Court, General Term. In the case of Samuel W. Lewis against Charles G. Wilson, as president of the Consolidated Stock and Petroleum Exchange, the General Term of the Supreme Court has decided that his suspension from membership was legal, and incidentally that speculative contracts for future delivery are also legal. Mr. Lewis's principal point was that the Exchange was without power to discipline him, for the reason that these contracts which he had entered into were illegal in that they were contrary to the provisions of the statutes against gaming and betting. The court said: "To make such contracts illegal it must appear affirmatively that they were entered into as gaming contracts and not as real transactions for the purchase and sale of property. When the gaming intent is not made out a contract for the future sale or delivery of stocks not owned by either of the parties at the time is a valid agreement, capable of being enforced between the parties making the contract."

An Indianapolis editorial, supposed to have been inspired by the President-elect, says "the Civil Service law must be enforced."

The General Assembly of the Knights of Labor, in session in Indianapolis, on Friday re-elected General Master Workman Powderly for two years, and also the following: Morris L. Wheat, General Worthy Foreman; John W. Hayes, General Secretary-Treasurer; Mrs. L. M. Barry, General Investigator of Woman's Work; A. W. Wright, John Costello, James J. Holland and John Devlin, members of the General Executive Board. The latter were named by General Master Workman Powderly.

The American parcels post system already comprises within its scope Canada, Mexico, Honduras and the West India Islands, and will soon be extended to most of the States of Central America, as well as China and Peru. Of the merchandise transported all but 15 per cent. originates in the United States and is sent to foreign purchasers.

Manufacturers in the domestic silk industry are at present very active, but prices are low, owing to competition. The total annual production is valued at about \$60,000,000. Twelve large mills in Paterson alone turn out about \$10,000,000 annually of finished goods, not to speak of the output of more than 100 smaller concerns. The imports of silk manufactures at New York during the first six months of the current year amounted to nearly \$16,000,000, and of unmanufactured silk at all the ports, \$11,329,000.

Bedell, the mortgage forger, lately in the employ of a leading law firm, was sentenced by Recorder Smyth to 25 years and 4 months at hard labor in the State prison. The Recorder said the crimes he had committed were of very great enormity, remarking further: "This community has

been recently startled by a large number of cases almost similar to the one which your case presents. Something must be done, and it is the duty of the Court to endeavor, if possible, to deter others from the commission of similar offenses."

The building season in New York for 1888 shows a great decline in the number and extent of new investments, compared with 1887. According to the statistics of the Bureau of Buildings the number of buildings proposed in 1887 up to the 31st of October was 3981, at an estimated value of \$62,941,072. On October 31, this year, the total number of buildings proposed to be erected was 2704, at an estimated value of \$40,886,375, thus showing a decrease of 1277 buildings and \$22,054,697.

	Buildings.	Estimated value.
1887.....	3,981	\$62,941,072
1888.....	2,704	40,886,375
Decrease.....	1,277	\$22,054,697

The decline is attributed wholly to overproduction, more dwellings having been erected on the West Side than there are people to occupy them. The outlook for 1889, therefore, is not promising.

The situation in Samoa is strained, the several consulates being under guard by marines from men-of-war in the harbor, while American and English merchants, it is charged, are subject to gross indignities from the German invaders.

A letter from Barcelona, speaking of the Spanish exhibition, says: "There is a general feeling of dissatisfaction among Americans here about the whole thing. There are some street cars, and some machinery and tools from New York, a reaper and a windmill on exhibition, but nothing worthy of the United States."

A number of capitalists of Cleveland have engaged in a project for a water-pipe line system to supply the Ohio cities and towns with water from Lake Erie. If it proves feasible to run 230 miles of pipe they will undertake to supply Columbus and Cincinnati.

The Chinese Government, without formal action, is silently retaliating the Chinese exclusion act of Congress by withdrawing from American markets. One of our contemporaries remarks: "Quite large amounts of American clocks, machines, heavy cotton goods, sheetings and the like have heretofore been taken. This is all stopped. The Chinese merchants—than whom there are none shrewder in the world—offer no explanation of their change of attitude. They simply decline to buy. Their tea we can have for coin, but they can buy textiles and machines where they are better suited. Here is a young trade, already amounting to millions per annum, imperiled, at great loss to our merchants and shipowners, and which our rivals may get! For whose benefit? Nobody's, unless it may be a few office-holders and laborers on the Pacific Coast, who hope thereby to enhance the cost of labor to their fellow-citizens, the employers of labor."

Detroit papers more than intimate that the scheme for building a tunnel under the Detroit river for railroad purposes will end on paper. The Michigan Central Railroad Company have taken legal proceedings to condemn the land required for tunnel purposes, claiming that it is needed for the extension of another railroad track. The projector of the tunnel scheme, who founded the Detroit Bridge and Iron Works, persists in his determination to build the tunnel, in the interest of the city.

The high price of copper is bringing into life numerous producing companies who long ago suspended operations because they ceased to be profitable. At least a dozen of that description are men-

tioned which might easily resume. The Boston Transcript remarks: "This country could probably supply the world with copper, and if the French syndicate persists in maintaining the present price, this country will surely add to its producing capacity. High prices always stimulate production. Stimulated production ends in overproduction, to be followed by a collapse in high prices and underproduction, which in turn again stimulates prices and production, completing a trade circle. It may be argued that the syndicate will crush the new companies, which it may, but alas, the promoters of new companies are in numerous instances the managers of old companies that are now syndicate allies. This copper problem is an immense problem, and thousands of interested parties will watch its solution."

The publication of the 22d volume of the Tenth Census Report, which has just been issued, completes a most elaborate work. The report complete includes 22 volumes, in addition to which there was a preliminary volume giving tables of population, and a compendium of two quarto volumes of 1772 pages. The whole report makes a library of 19,304 pages, and cost, exclusive of printing, engraving and binding, \$4,853,350, or 9 $\frac{1}{2}$ cents per capita of population in 1880, a less relative cost than any similar publication ever issued. The appropriation for printing, engraving and binding was \$1,018,116.

The new bureau in the Agricultural Department at Washington is about to go in operation under the direction of Prof. W. O. Atwater. A feature of the work will be to engage the ablest specialists in this country and Europe to compile articles on subjects about which information may be required. Still another function of the bureau will be to supply Congress with information that may be found necessary to aid in its legislating upon agricultural matters.

The total production of wool in the world is estimated at a fraction over 2,000,000,000 pounds. Australasia is put down in this estimate at 455,570,000 pounds, the United States at 307,588,000 pounds, the Argentine Republic at 283,047,000 pounds, Russia at 262,966,000 and Great Britain at 135,000,000 pounds. All other countries range each below 100,000,000 pounds.

The American Forestry Congress, which will be held in Atlanta, Ga., on December 5, next, has for its object the creation of a public sentiment in favor of a more rational treatment of our forest resources.

It is announced that wages in the copper mining regions are to be advanced, in response to the advance in the selling prices of copper.

The African native chiefs in the interior regions back of Zanzibar and in the vicinity of Lake Nyanza are likely to find use for thousands of firearms, sold to them by Europeans in exchange for ivory, slaves, &c. The alleged German invaders are the first to suffer from their fierce animosity.

Chief Engineer Church of the Aqueduct Commission having resigned, he is succeeded in that office by Alphonse Fteley, vice-president of the American Society of Civil Engineers and a graduate of the Paris Polytechnic School. He has been an active engineer all his life. The cost of maintaining the engineering corps will be reduced one-third on account of the advanced stage of the aqueduct improvement. General Newton, late Commissioner of Public Works, is succeeded by David Lowber Smith, who has a thorough acquaintance with the department.

MANUFACTURING.

Iron and Steel.

The report that the Spearman Furnace, of the Spearman Iron Company, at Sharpsville, Pa., had been closed down on account of labor troubles is without foundation. On Monday, the 19th inst., the men gave notice that they must be paid an advance of 10 per cent. in wages. This was refused and the furnaces were banked down for one day, when the men withdrew their demand and operations were again resumed at the old rate of wages.

A press dispatch from Chambersburg, Pa., under date of the 22d inst., says: "Mr. A. Whitney, an extensive car-wheel manufacturer, of Philadelphia, is negotiating for the purchase of part interest in the Falling Spring Furnace, in this place, long operated by Hunter & Springer and C. Burkhardt & Co., but which has been idle for several years. The negotiations have not been completed, but it is stated on good authority that Mr. Whitney will purchase a one-third or a two-thirds interest in the furnace, and that it will be put in blast as soon as arrangements can be made for securing a sufficient supply of charcoal."

Carnegie, Phipps & Co., Limited, are contemplating the erection of three additional open-hearth furnaces at the Homestead Steel Works, at Homestead, Pa. A member of the firm on being interviewed regarding the matter made the following statement: "We are making improvements when they are found to be necessary, but do not desire any publicity. Work on the three new furnaces has not been commenced, but they may be built soon."

The Pittsburgh Steel Casting Company, of Pittsburgh, have been notified by Secretary Whitney, of the Navy Department, that the Hainsworth cast-steel gun will be tested on December 5.

It is stated that William F. Nevigold, of Bristol, Bucks County, Pa., has been in Rome, Ga., making final arrangements for the establishment of a large rolling-mill plant in that place. Several other Pennsylvanians are also interested in the enterprise, the product of which will be principally in the shape of hoop iron and cotton ties.

The plant of the Apollo Iron and Steel Company, located at Apollo, Pa., is to be improved by the erection of at least one additional sheet mill and possibly an additional steel furnace.

Oliver Bros. & Phillips, of Pittsburgh, are gradually changing their furnaces at the South Tenth street mill, to make them like the puddling furnaces in their Allegheny plant. This is part of a change from high to low pressure in the use of gas. The dimensions of the pipes will be increased.

No. 2 furnace, of the Allentown Iron Works, at Allentown, Pa., is being dismantled.

Joseph Hunt has resigned his position as general manager of the Cameron Iron and Coal Company, at Emporium, Pa., owing to variability of climate, and will spend the winter in the South. The resignation takes effect on January 1 next, and, in the meantime, the new blast furnace, erected under the supervision of Mr. Hunt, will be put in operation.

While experimenting on a patent process for burning Lima oil, at the plant of the Beaver Falls Iron Company, Beaver Falls, Pa., on the 19th inst., an explosion occurred, destroying the puddling department of the works and severely injuring six men, one of whom has since died. The loss is estimated at \$10,000, fully cov-

ered by insurance. The Whitaker Iron Company, of Wheeling, W. Va., are the principal owners of the plant.

The Duluth Iron and Steel Company are now putting up the shell of their furnace at Duluth, Minn. The casting house and engine house have been finished except the roof, which is being hurried to completion also. Outside work at this plant will then be suspended for the winter, but shopwork will be actively prosecuted.

The Minnesota Car Company are erecting very extensive buildings for their new works at Duluth, Minn. They are already well under way and will be pushed through the winter, so as to be ready to install the machinery as soon as possible. The plant includes axle works and a rolling mill. The latter will be operated on scrap and will turn out stock for the axle works, as well as some sizes of bar iron for the car shops. The company expect also to make their own car-wheels. The capacity of the works will be 15 cars per day.

The West Superior Iron and Steel Company have their large pipe foundry at West Superior, Wis., ready for the roof. It is a brick building, 550 feet long and 70 feet wide, with annexes making it 120 feet wide in part. The machinery will be put in this winter, so that the plant will be ready for work in the spring. The foundations for the company's blast furnace have been started, but further operations in that direction have been suspended for the season.

Machinery.

The J. H. McLain Machinery Company, of Canton, Ohio, are at present employing over 100 hands, an increase of 50 per cent. over last year. The firm operate their plant 12 months in the year, and make five styles of grain grinders—two for steam and three for horse-power—the Fouty windmill and general foundry and machine work.

The Baldwin Locomotive Works, it is said, will turn out this year 700 locomotives, equal to at least two locomotives every working day. Last week the works received a contract from the Argentine Republic for the construction of 80 freight, passenger and shifting locomotives, to be delivered early next year. They are for use on the Provincial Railway, running to Buenos Ayres.

The Waterbury Farrell Foundry, at Waterbury, make a specialty of headers for special shapes for working cold, which formerly was worked hot. A double-header is being built for a concern in Cleveland and another for P. & F. Corbin. They are building considerable machinery for the Aluminum Brass and Bronze Company, at Bridgeport, Conn.

A press dispatch from Fort Wayne, Ind., under date of the 23d inst., says: "The Fort Wayne Jenny Electric Light Works were totally destroyed by fire early this morning. Loss \$300,000; insurance, \$148,000. Three hundred employees are temporarily thrown out of work."

The St. Louis Iron and Machine Works Company, of St. Louis, are contemplating the reconstruction and enlargement of portions of their extensive works and also the addition of a large amount of new and improved machinery.

The Wilmsen Belting Company, of St. Louis, Mo., have sent us one of their small catalogues directing attention to their rawhide belting, for which superior advantages are claimed.

The demand for a smoother to do the smoothest of surfacing has increased so much of late that the Egan Company, of Cincinnati, Ohio, have devised a special smoother to work off a surface

from any kind of wood. This machine, we are told, has met with the most pronounced success, having been awarded the medal of superiority at the Cincinnati Centennial Exposition.

The Brown & Sharpe Mfg. Company, of Providence, R. I., have just sent us several of their catalogues. One of them, dated April 1, 1888, is principally in the nature of a price list, though engravings and descriptive particulars of the different machines and tools are given. It will accordingly be found of general interest to machine-tool users. A second catalogue, rather more pretentious in arrangement, is of earlier date, but has several inserted pages which show some of the later developments in the machine-tool line. The engravings in this catalogue are generally well executed, and add in a great measure to its attractive features. A third catalogue gives a list of books in the library which the company have established for the benefit of their employees, and which shows in a very striking way that the intellectual requirements of the latter have not been neglected. The books have been carefully selected with the view of affording instruction as well as entertainment.

Messrs. William Seafert & Co., of Chicago, Ill., have issued a small catalogue briefly setting forth the features of the Seafert electric system of light and power. The system is applicable to arc and incandescent lighting, galvanoplastic work, street railway propulsion, and the general transmission of power.

Mr. George J. Fritz, of the Central Iron Works, St. Louis, Mo., has just sent us a catalogue giving price and dimension lists of pulleys, shaftings, couplings, &c. The lists are very comprehensive, and will no doubt prove interesting to power users.

Messrs. Evens & Howard, manufacturers of fire brick, gas retorts, &c., have just issued a small catalogue directing attention to their specialties, among them salt-glazed sewer pipe. A number of illustrations are given, together with particulars of general trade interest.

Hardware.

Shepard Hardware Company, Buffalo, N. Y., have been making some improvements in their Lightning ice-cream freezer, the sale of which during the past year they refer to as having been very large. They are working on patterns for sizes 20 quarts and upward, to be made with fly-wheels. They are also at work on a new catalogue which they expect to issue in a few weeks.

In a recent paragraph relating to the purchase of Geo. G. McMurtry's plant for the manufacture of hot-pressed nuts by the Iron City Mfg. Company, the address of the company was incorrectly given as South Pittsburgh, Tenn., instead of Pittsburgh, Pa.

Benjamin Burgess, late of Drake's Standard Machine Works, has established a factory for heavy edge tools at 209 South Clinton street, Chicago. He makes a specialty of butchers' cleavers, but also turns out mill picks, paper knives, brick knives and turning tools.

The display track of the "Fat Stock Show" in the Chicago Exposition Building is inclosed by a steel picket fence of the Hartman Mfg. Company's make. This novel fence, we are informed by the agent, has been sold and shipped to 38 States and Territories during past season. A large increase in capacity has been effected at the works in Beaver Falls, and branch sales agencies established in Chicago and Kansas City. The company are now exclusive sales agents for the Hartman mats, which are referred to as having been improved by recent inventions. Special machinery has superseded hand work, thus enabling the goods to be sold

at materially lower prices than heretofore. The demand for the new Hartman Flexible is especially referred to, large export orders having recently been received.

The St. Nicholas Mfg. Company, 784 to 794 Madison street, Chicago, have issued a very handsome catalogue of 48 pages, containing illustrations, descriptions and price lists of children's goods. Their line comprises sleds, hand sleighs, toy furniture of all kinds, children's desks, parlor cylinder desks, folding card tables, blackboards, express wagons, doll perambulators, bicycles, &c. Many of their goods have been greatly improved by the introduction of new and special designs, and their line has been considerably increased by the addition of more sizes and a greater variety of styles. The company have a wholesale and retail salesroom at 177 Wabash avenue, their office and factory being located at the address above given.

St. Louis Shovel Company, St. Louis, Mo., are making extensive alterations and improvements in their plant. They are placing in position a number of steam presses and hammers, and have put in operation quite a number of ovens operated by the aerated oil process, which, in addition to giving the requisite high heat which is necessary, also does away with the bother of coal and ashes. When the alterations are completed their capacity will have been about doubled, and they will be in a position to handle their increasing trade with promptness and dispatch.

We are informed that the report that James H. Mann, axe manufacturer, at Lewistown, Pa., had notified his employees of a 10 per cent. advance in wages, to take effect on December 1, is without foundation.

Miscellaneous.

The statement recently published that the Cambria Iron Company, of Johnstown, Pa., had purchased the plant of the Dunbar Coke Company, in the Connellsville region, is without foundation. The truth of the matter is that the Cambria Company have purchased about 40 acres of the Connellsville coke bed and 80 ovens, the same being the plant of the Atlas Coke Company, and are now operating the same. Possession was given on Thursday, the 15th inst.

The works of the Faraday Carbon Company, at Pittsburgh, destroyed by fire some weeks since, have been rebuilt and were put in full operation this week.

A report was published in Pittsburgh, last week, to the effect that the H. C. Frick Coke Company had purchased a controlling interest in the property of the Connellsville Coke and Iron Company, located in Dunbar township. N. P. Hyndman, the Western States agent for the latter firm, with headquarters in Pittsburgh, states that there is no truth in the report whatever.

The De-Oxidized Metal Company, of Bridgeport, Conn., have issued three small pamphlets devoted to their different specialties. One of these is Babbitt metal and various other grades of anti-friction metals. The pamphlet devoted to these gives, among other things, figures of speed, which are guaranteed for the different compositions. Another one of the pamphlets directs attention to name-plates of de-oxidized bronze, suitable for manufacturers' purposes. Artistic bronzework also is treated of, together with de-oxidized bronze bells for public buildings, locomotives, steamboats, &c. The third pamphlet finally gives prominence to the use of de-oxidized bronze and copper in ingots, bars and castings of all kinds.

The Iron Age

New York, Thursday, November 29, 1888.

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RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Interstate Commerce Law.

It must be admitted that our railroads, as a whole, are not as prosperous as they were last year or even as they should be to earn interest charges and the usual dividends. It is true that the protection of private ownership of stock sometimes requires the announcement in Wall street that large earnings warrant a dividend, but this is contrary to other facts put forth. An unusual number of interviews with prominent railroad men have appeared in the daily papers, and all charge the Interstate Commerce law with being the cause of the whole decrease in net profits. With this is coupled the statement that better times in transportation cannot be expected until this law is repealed or essentially modified. All signs point to a combined and skillful attack upon the law in Congress, public opinion being meanwhile influenced through Wall street by articles or interviews in newspapers and by papers in leading magazines. In this last respect Mr. Blanchard's article in the August *Forum* upon the necessity of railroad pools is, we understand, likely to be followed by others in the same strain. It is more than hinted in some quarters that something at least of the present cut in freight rates was due to or is now kept up for the purpose of creating the very impression which we are discussing—that the Interstate law "must go."

Whether the Interstate law cannot be amended with benefit is still an open question, and therefore the discussion of changes in the direction of the public good is a very practical one, but such business discussion is not helped by unfairly charging to that law every change in the commercial world which may affect railroad-ing or any other business unfavorably. It is the opinion of many merchants that the law as it stands has turned out to be more favorable to the railroads than to them, and it will be a surprise to them to learn that a strong effort will be made to repeal the only sections of the law which put any checks upon tariffs. The partial failure of the wheat crop and consequent loss of export traffic is for one thing surely not chargeable to any legislation, nor the further fact that sales of manufactured goods in the territory of the short crop may not be as great as last year, to the loss of merchant and carrier alike. It is therefore of importance to the full discussion of any repeal of the existing law that business men should form their opinions according to the merits of the case without regard to one-sided newspaper writings.

One point deserves attention. In the place of the section prohibiting pooling it is proposed to substitute one which shall legalize pools. The argument, briefly, in this: All the trouble comes from rate-cutting, which makes one shipper pay a higher rate between two points

than his competitor shipping between the same points by another road. This, practically, has just as bad an effect as though the two men shipped over the same road at different rates. If pools were strong enough they could compel the observance of the same tariff on all lines, and, hence, to legalize pools will secure the desired impartiality. A strong argument, but, as a matter of practical politics, no party could afford to contemplate such action in the present state of public opinion west of the Mississippi and the great lakes. It will, therefore, be proposed that pools so legalized shall be put under the Interstate Commission. But here comes in the further question: What shall be the powers of the commission over legalized pools? If it be merely to register the statistics of the pools, then the latter would be masters of our commerce. It is not probable that public sentiment in the West would ever consent to this. There remains, then, the alternative that the commission should have power to order a reduction or advance in the rates. They are doing this now, but only relatively. If one place or article is given a rate, then another must have it, too. They do not pass upon any rate of itself—that is left to the railroad managers. But, in the case of power over legalized pools, there would be the right to change rates, not relatively, merely, but absolutely. This would be really giving the Government and not the railroads the power to make freight rates. Suppose, under such a system, that the freight rates on iron became a political question and was carried into Congress! We can all see the great changes and dangers to our commercial methods which would flow from such a system. There is further to be considered the bearing of all such legalizing or ignoring of railroad pools upon the general subject of combinations and trusts, to the evils of which the public mind is somewhat sensitive.

It must be confessed that the problem of railroad control is very difficult, and one where no solution yet in sight gives promise of avoiding injustice to either side. It is really a question of expediency, a business question, and when it comes up in Congress, and any proposed change is embodied in a bill, the business men of the country, after carefully considering the whole matter, should make their influence felt.

There is a good deal that is suggestive in the recent substitution in several cases by the British Admiralty of 12-hour trials for war ships for the hitherto customary six-hour runs. The utter uselessness of these latter as measures of what ships can do when in commission was pointed out a number of years ago, and since then every breakdown of a ship's machinery has given further opportunity for heaping strictures upon those responsible for the narrow time limits. As a matter of fact, every one who has given even the slightest attention to the matter knows that the engines in the navy, both here and abroad, can be made to work satisfactorily under full speed for a period of six hours only with the greatest difficulty, and are rarely, if ever, expected to be afterward called upon to repeat the performance. Experience, at any rate, has shown that where full speed runs have been attempted in the course of regular work a breakdown invariably has

resulted. The reasons for this are perfectly clear. The engines are made extremely light, much lighter than those of the mercantile marine, with a consequent loss of rigidity and strength, and as a final result we find the several navies priding themselves on the possession of, say, 18 and 19 knot vessels, so listed by official trial, while in reality probably none of them could maintain such a speed even for only two of three hours. The absurdity of such a system of classification is painfully apparent. A year or two ago some effort was made in the United States to have the duration of trial trips reduced to four hours, a circumstance which, however, very fortunately did not come to pass. To be of practical service at all the trials should long since have been extended over several times their present duration, and the new course of the British authorities is therefore deserving of all praise and worthy of being followed by others.

The World's Glut of Merchandise.

In all quarters of the globe the volume of merchandise seeking transportation appears to be in unusual volume, so that facilities for carriage on land and sea alike are not infrequently taxed beyond their utmost capacity. The foreign and domestic commerce of the United States are no exception to the rule. The scarcity of ocean tonnage at the port of New York has been a standing complaint for some weeks past, and tonnage is reported to be in demand the world over for the conveyance of merchandise. In many foreign trades the rates paid are higher than in New York. The natural consequence is that freight awaiting transportation has accumulated heavily at this point, while vessels are obtained with increasing difficulty. The most reasonable explanation of the scarcity of shipping is the rush of tramp steamers to share in the profits of the Russian wheat trade, and as this class of steamers exerts a controlling influence in the freight market the usual supply of tonnage available in American ports is much deranged. Outward rates to South American and East Indian ports are noticeably advanced. Many vessels have been detained in Australia by the labor strikes there, and a large number have been caught by the winter in the Black Sea. One effect of the situation is to start a heavy boom among shipbuilders in the United Kingdom, whose yards are reported to be full of work in progress, with engagements sufficient to keep them occupied for a year to come.

From a review of the situation the conclusion is inevitable, as we gather from shipping agents and ship owners in this city, that the waste of ocean tonnage from natural causes has not been replaced by recent additions, while the world's traffic in all directions has of late received a strong impetus. The present outlook, therefore, is good for American shipbuilders. Their yards are already well occupied, with the assurance of heavy contracts yet to come, on Government account as well as from several corporations and individuals, who contemplate additions to their respective fleets. With foreign builders fully occupied the "free ship" privilege, for which some have so vociferously clamored, is likely to prove of doubtful advantage. The new year, under these circumstances, may be

considered as looking more cheerfully for American shipbuilders, perhaps, than ever before, and this is true of the seaboard as well as of builders on the lakes. Nor should the influence upon the iron and steel trades of the United States of high ocean freights be overlooked. They have now cut off to a considerable extent imports of foreign material, to compensate for the falling off in the demand for material on the part of the railroads.

A New Era in Ecuador.

Since the revolution in 1885 a new era of prosperity has been inaugurated in Ecuador, a country of manifold and splendid resources. The equator passes through the northwestern corner of Ecuador, but the heat is tempered toward the Pacific by the mountainous character of the country traversed from North to South by the Cordillera of the Andes, and on the Eastern slopes of these all the way to the plains by the great watershed of the Amazon and its tributaries. The soil being fertile and the climate not too dry, Ecuador abounds in a variety of leading tropical staples, chief among which is cocoa. All Ecuador requires is peace, better finances and railroads.

The republic covers an area of 206,200 square miles, including the Gallápagos Islands; the population was 1,004,651, as per census in 1885, of whom 252,000 inhabited the 15 chief cities, without counting 600,000 wild Indians in the Eastern provinces. The new President, Dr. Antonio Flores, whose term of office will expire on June 30, 1892, has long been Ecuadorian minister in Washington and Paris, and is favorably known as a man of great ability and energy, whose administration will inspire confidence. Dr. Flores is in the first place bent upon reorganizing the finances, in a poor plight through occasional revolutions. On the sterling debt of £1,824,000, on which interest was paid during 37 years, from 1830 to 1867, unpaid coupons have accumulated to date to the amount of £373,920, although the rate of interest was temporarily reduced to 1 per cent. Including these £2,197,920 the republic owes abroad and at home only \$14,348,582, principal and unpaid interest, a mere trifle, the income of State being \$5,107,992 in 1886, and rapidly on the increase since then. For any money the Government requires at home it has to pay 9 per cent. interest to the banks at Quito, who declared dividends last year of 16 to 20 per cent. Once the sterling debt is in proper shape, Ecuador would probably be able to procure money in Europe at 5 per cent. An American syndicate is even now ready to build a railroad from Quito to the Pacific if the credit of the republic were restored. Hence the Government has lately informed the English bondholders that it was ready to treat with them if they would send an agent to Quito furnished with full power, a proposition which they have consented to. Meanwhile, in order to be able to repress promptly any renewed attempts to break the peace at home, the standing army has been reorganized, now counting 4730 file, together with the national guard, all fully equipped, and Remington rifles in the arsenals for an emergency. The navy

consists of three war steamers of modern construction and armament, built in England, ready to co-operate with the army by preventing the landing of rebels, so frequent in former years.

A syndicate of Canadian bankers and merchants obtained in March last by purchase control over the railways built by Mr. Mark J. Kelly, together with those in course of construction, and they are now being finished rapidly, one being the Yaguache-Duran Line, another the Yaguache-Chimbo, and the Chimbo-Sibambe. The distances are not great, but the engineering difficulties all the more so. Agriculture is the main source of wealth, but Ecuador is also rich in gold. Among other quartz mines there are the Zaruma and Cascajal, and the placer mines along the Chimbo River. An English company is engaged in gold mining at Portobello, in the Zaruma district. Cocoa receipts at Guayaquil for shipment abroad amounted to 334,267 quintals of 101½ pounds American in 1887, against 384,752 in 1886. From January 1st to October 23d, this year, the receipts were 254,000 quintals, against 305,000 during the corresponding period of last year; the quality is medium. Ivory nuts have also become an important export article, 258,125 quintals being received at Guayaquil last year, against 197,808 in 1886. The total export in 1886 amounted to \$8,014,409. The American trade presents the following figures:

Fiscal year.	Import into the United States.	Domestic export to Ecuador.
1887.....	\$1,131,169	\$1,049,392
1888.....	1,118,627	810,567

Telegraphic communication was established this year between Quito and Bogotá, the capital of Colombia, and Guayaquil, by cable, communicates with the rest of the world. One of the drawbacks which the inhabitants of Ecuador suffer from frequently is the earthquakes, caused by the occasional activity of the volcano Tungurahua, which had been silent since 1797, but had a formidable eruption in January, 1885, since when shocks of earthquake have multiplied, one occurring on September 25 last and one on November 16. If an influx of foreign capital completes the Ecuadorian railroad system—as there is now every prospect will be the case—the republic will no doubt enter upon a period of prosperity from which our commercial relations with it will not unlikely benefit largely.

In the "Statistical Abstract," of which a second edition has lately been published by Mr. James M. Swank, we find some very instructive figures bearing on the iron industry of New England, concerning which there has been considerable discussion of late. Taking Prof. J. P. Lesley's figures for 1856, Mr. Swank makes the following comparison: In 1856 New England produced 34,051 net tons of pig iron; in 1887 it turned out 37,252 tons. In the meantime the make of the country rose from 911,698 tons to 7,187,206 tons. Now, on the face of it New England has remained woefully behind, and yet, when we go behind the returns, the case does not seem to be quite so desperate. Practically speaking, New England has never made anything else but charcoal pig iron. Now, in 1856 the whole country made 330,321 tons of that class of pig, of which New England is credited with 34,051, or

a little over 10 per cent. In 1887 the quantity of charcoal iron made in the United States was 578,182 net tons, of which New England made a little less than 7 per cent. The position is far more serious in rolled iron, including iron nail plate and iron rails. While the production of the whole country has advanced from 557,850 net tons in 1856 to 2,588,500 tons in 1887, New England can show a record of progress only from 78,989 tons to 85,101 tons; and it may be stated in regard to the latter figure that by far the greatest part of it must be the make of one mill. In the manufacture of cut nails New England has declined from 560,000 kegs in 1856 to 267,453 kegs in 1887, while the mills of the whole country made 6,908,870 kegs in 1887, as compared with 1,824,749 kegs 30 years since. We believe that the causes for this decline are not far to seek. Practically, New England has no mineral fuel suitable for blast-furnace use, except what the Rhode Island anthracite may possibly prove itself to be worth. In accessibility to raw materials and proximity to the greatest markets New England cannot compete with its rivals east and west of the Allegheny Mountains. Its decline is due to natural causes, and can only be arrested by special measures.

Natural Gas in Iron Making.

During the past year complaints have become more numerous among the iron-makers who have adopted natural gas as a fuel in their works. The grounds for dissatisfaction have been twofold, speaking in general terms. The most serious probably has been the inadequacy of the supply at different seasons and fluctuations in the pressure at certain times. The second has been the tendency displayed by the natural gas companies to advance the prices.

With the object of securing data upon which to base some conclusions concerning the magnitude of the evil *The Iron Age* has called upon manufacturers to give them confidentially the facts bearing upon the questions whether or not they had given up the use of natural gas as a fuel, whether or not they have or are now experimenting with any new fuel gas, whether they had modified their appliances for burning natural gas, and whether there had been any recent changes in the price.

Spreading broadly, the replies come from three districts, Pittsburgh and its outlying districts, Wheeling and the Mahoning Valley, replies being received from 35 firms. From Pittsburgh reports concur in stating that natural gas is generally used now wherever it has been introduced in the district, and the manufacturers agree in stating that although prices have been advanced from 20 to 75 per cent. and more the balance is still in their favor. In one or two instances experiments with fuel gas are being made, and the consensus of opinion seems to be that improvements have reduced the consumption of gas considerably. We quote the following two letters as fairly representative:

We think none of the manufacturing establishments using natural gas that are situated in the natural gas field proper or in close proximity have given up its use, or have had any want of supply or satisfaction in its use, further than a temporary annoyance at

two or three times for a day or two during the last two or three years, caused by accidents to lines or the consumption for the time being exceeding the piping capacity. We have not experimented for any new fuel process, as we have not found it necessary. A slight advance has been made to some consumers during the last year where the previous rates charged were abnormally low. Ourselves and others have made improvements in the modes of using gas to avoid a useless waste, and the gas is more sensibly and economically used now than during the earlier days of its use. Even with the present enormous pipeage capacity of the companies in the vicinity of Pittsburgh, two-thirds of the present consumption could be supplied from these pipes if the waste were as great as in the first year or two of its development.

The second letter referred to reads as follows:

The natural gas companies in this district have all or nearly all made some advances in their charges for the fuel, but I believe the main reason for this is, that the running expenses of the companies and the cost of maintenance of pipe lines prove to be larger than at first estimated. Our supply runs very steady; our appliances have been very economical from the start, and we have made no changes in the same of late. While it is likely that the natural supply will weaken or give out some day, I think that day is as yet in the remote future. In nearly every case where individual wells have weakened, the cause has proven to be the too close location of other wells to the same. For instance, I know of one company whose first well they drilled was a tremendous gusher; the second one in the same field was also a good one. They subsequently drilled four more holes near by, and now the six holes do not produce much more than the two first ones, but otherwise the flow is pretty steady. The same company have now leased another field, about 8 miles distant from the first field. New gas territories are being discovered constantly. The Versailles territory, which was at one time already abandoned, is now producing nicely, it having been discovered that the main supply of gas is found at about 2300 feet to 2400 feet depth. Several large works are now supplied from this territory.

From another manufacturing center we have the following report, which treats the subject from a different standpoint:

We have not given up the use of natural gas, but have found the supply so variable as not to be satisfactory. We have had to put at least half our boilers on coal to make good the deficiency, as, in order to run our mill steadily, it must, of course, be equipped for minimum supply of gas, not the maximum. Speaking generally, we would say that even if the supply of natural gas had been entirely satisfactory we would deem it wise to be prepared with an alternative. On the first consumption of natural gas, one of its greatest claims was that it could be turned into any ordinary furnace. With continued use soon came the demand for economy, which means many changes in the construction of the furnaces to suit them to natural gas. With a plant once adapted particularly to natural gas the large manufacturer finds himself very much at the mercy of the company supplying the gas, and has to put up with many vexatious irregularities, as a change back to any other fuel involves considerable cost and delay. The part of wisdom is, therefore, to prepare an alternative plant for the supply of an artificial fuel gas of such nature as can be turned into the same mains as those which supply your natural gas, and which can be worked in identically the same manner. We question very much whether such an equipment run steadily will not be found more economical in the long run, even at a slightly increased gas cost, than an irregular supply of the natural gas.

In the Wheeling district the question of the supply of natural gas has been somewhat vexatious, and while its use has not been entirely abandoned by more than two concerns, other works have restricted its employment to certain parts of their es-

tablishments, and all seem to suffer more or less from shortage at certain seasons of the year. The winter consumption for domestic purposes has become so important a factor, and so profitable to the natural gas companies, that, tempted besides by the higher price they have succeeded in getting from this class of customers, they have been unable to supply all the manufacturing establishments. One of the managers of the district goes over the ground in the following communication:

We have not given up the use of natural gas. Our supply is somewhat limited, but by using a little coal we are able to get along comfortably. Contemplating the possibility that the supply of natural gas might give out, we have looked carefully for some kind of fuel to take its place, but have as yet been unable to satisfy ourselves as to the best substitute. Some of our competitors have been using some of the cheap Ohio oils, but, so far as we can learn, the experiment has not been a success; and even should some successful mode be discovered of using this oil, the supply is about as uncertain as that of gas. We have not modified our appliances for burning natural gas, and have never been able to see much economy in any of the various appliances that have from time to time been adopted. Should the supply of gas become an entire failure, we should probably go back to the use of coal, burning it as we did before gas was introduced; but have no doubt that the time is not far distant when some more economical mode of using coal will be discovered and adopted. I have talked with parties who are using oil, vaporizing it by a jet of steam, and with others who use various patent appliances for converting the oil into gas, and the concurrent testimony is, that with coal at \$1 to \$1.25 per ton, it would be a cheaper fuel than oil at 65 cents per barrel. As we own our own coal, and can deliver it at the works for less than \$1 per ton, we would be inclined, as above stated, to fall back on coal as a fuel should our natural gas supply fail. While gas manufactured from coal can be used economically for heating or puddling purposes, we have not been satisfied that any plan has yet been adopted by which fuel gas could be used effectively and economically for generating steam.

In the Mahoning Valley the situation is far more serious. We have reports from five large works which acknowledge that they have been forced to give up the use of natural gas for the sole reason that the supply has been irregular and inadequate. One of them informed us that the pressure fluctuated between the extremes of 50 pounds and zero, while the majority appear to have made efforts to reduce the quantity consumed by modifying the appliances. They have returned to the methods used by them before making the change—some again burning coal, and others fuel gas. Among the latter, one reports a consumption of about 600 pounds of slack and nut coal, all told, including lighting up, to the ton of finished iron, by employing Smith gas furnaces. One works is experimenting with a new fuel gas process. One mill runs on coal in the boiling furnaces, and on natural gas in the finishing department.

Summing up the results of our inquiries, we may state that inadequacy of supply is only keenly felt in the Wheeling and Mahoning Valley districts, that there is considerable activity and much interest in improved methods looking to fuel economy, that, on the whole, natural gas is less wastefully used, and that the tendency is strongly in the direction of equalizing the prices which manufacturers are paying for their natural gas. It is evident that whenever there is a shortage, the supply to domestic consumers is given precedence

to that of the manufacturing establishments. We cannot close our review without quoting the following paragraph from a letter from the general manufacturer of one of the largest works in the country, who says: "I think it can be laid down as a general principle that, where natural gas is ample for the wants of the manufacturer, and is supplied to him at a moderate cost, he would prefer it above all others as the most reliable and generally useful for the largest range of heating, giving the maximum and minimum heat just as it is required."

OBITUARY.

JOHN R. ONDERDONK.

John Remsen Onderdonk, an engineer of national repute, died at Chicago on the 22d. inst. At the time of his death he was in charge of the construction of the tunnel under Lake Michigan, intended as a part of the new Chicago water supply. His brother, Andrew Onderdonk, is the contractor for the work. John R. Onderdonk was born March 22, 1840, in New York. He was a descendant of one of the old Dutch families that had taken from the first a prominent part in public affairs. His father, John Remsen Onderdonk, was a civil engineer of prominence, while one of his uncles, William Treadwell Onderdonk, was bishop of Pennsylvania, and another uncle, Henry Onderdonk, was bishop of New York. Mr. Onderdonk was educated in New York, studying architecture as a profession. He did not study engineering as a specialty, his successes in this line having been made in later life. At the opening of the war he enlisted in a New York regiment, serving with the Army of the Potomac, as well as in the later campaigns. He was twice wounded, and retired with the rank of major, but he never used his military title, and made no boasts of his war record, which was that of a brave soldier, nevertheless. At the close of the war he married Miss Rosina Jacobs, of Jersey City. He leaves one son, a young man 19 years old, who is fitting himself to continue the family career by a course of study at the Stevens Institute, in Jersey City. Mr. Onderdonk's chief successes were made in conjunction with his brother, Andrew Onderdonk, who early achieved national reputation by his skill as a civil engineer. Andrew Onderdonk took 700 miles of grading on the Canadian Pacific Railroad, in the most difficult part of the territory traversed by that road in British Columbia. John R. Onderdonk was his brother's superintendent, and had full control of the work, which was carried to a successful conclusion. The other great works that stand as monuments to the dead engineer's talent are the Alameda bulkheads, the San Francisco sea wall, and the Oakland and San Francisco ferry slips. He was the architect of J. C. Flood's splendid house on "Nob Hill," and he planned and erected many other residences in the Pacific Coast cities. Mr. Onderdonk went to Chicago about a year ago, to take charge of his brother's contract on the water tunnel. His remains were taken to New York City for interment.

The Chicago, Burlington and Quincy Railway Company have notified the Indianapolis Car Works, at Indianapolis, Ind., that they have been awarded the contract to build 1000 box cars for that company, to be delivered as fast as practicable. This contract, with those recently taken, will keep the works busy until spring.

Ferro-Silicon and the Economy of Its Use.

At the last meeting of the American Institute of Mining Engineers, held at Buffalo, Messrs. W. J. Keep and Edward Orton, Jr., presented an interesting paper on ferro-silicon, which we take pleasure in reprinting practically in full:

During the past two or three years consumers of pig iron have been seeking more knowledge regarding the chemical questions involved in foundry practice. This desire has been increased by the papers of Prof. Thomas Turner, of Mason College, Birmingham, reporting a series of tests made to show that silicon is a useful rather than a damaging element when present in proper quantities in cast iron, and that by its use pig irons and scrap, which when used alone are totally unfit for foundry purposes, may be made to give satisfactory results. Professor Turner has shown that the strength of a cast iron depends on:

1. The amount of weakening impurities present.

2. The proportion existing between the combined and the graphitic carbon in the cast iron.

He says that the tendency of combined carbon is to increase hardness and brittleness, while graphitic carbon makes iron soft, malleable and tough; too much of either form is a disadvantage; the strength depends on the proportion.

Strength being the thing most desired, irons having an excess of weakening impurities will not find a market, and therefore the only thing to provide for is the proper proportion between combined and graphitic carbon. Professor Turner shows that by a judicious use of silicon this proportioning can be accomplished exactly according to the wish of the founder; an increase of silicon changing combined carbon to graphitic and *vice versa*. When the founder understands its use he may soften and toughen, or harden and strengthen his iron to suit his requirements; but Professor Turner warns him against the use of silicon, without first understanding when it is needed; for in an iron where the carbon is already graphitic, more silicon may weaken it and make it brittle.

From the effects produced by the extensive use of high-silicon irons for many years, and from the discussion of the subject during the past few years, silicon has come to be considered as a softening agent. In the United States for a number of years past many foundrymen have depended upon the irons made from the lean ores of Ohio and Kentucky as softeners to counteract the hardness of irons made from the refractory ores of Lake Superior and Northern New York and the irons of the South; but it has only lately been generally understood that this softening quality is due to silicon. Upon examining the analyses of Ohio softeners, made from native ores, it will be found that the percentage of silicon runs from 3 to 7 per cent., and that none regularly made previous to 1887 contained more than 7 per cent. As the process by which silicon accomplishes these desirable results has become better understood the demand for high-silicon iron has increased. In 1887 foreign irons containing as high as 10 per cent. of silicon were imported into the United States. These high-silicon irons go under the name of ferro-silicon. As the call for this imported product increased ferro-silicon containing from 7 to 14 per cent. of silicon, and of a very high grade in other respects, has been produced in America to supply this demand.

The question has naturally arisen whether the use of irons containing such a high percentage of silicon is as economical as when the percentage is lower. This

has led us to the experiments and conclusions set forth in the present paper. We shall treat the subject under the following general divisions: First, a comparison of the composition of foreign and American ferro-silicons; second, the inquiry whether the silicon in the pig is retained in the iron when remelted, and, third, the inquiry whether the silicon in the pig is imparted to other irons during remelting without loss of silicon.

I. *The Composition of Foreign and American Ferro-Silicon.*—To make this comparison we have selected from the stock of irons in our possession, and with which we are familiar, having repeatedly tested them, the following examples: Govan ferro-silicon, from a prominent Montreal firm, the analysis being published by them. (Marked *a* in Table I.) A foreign ferro-silicon, obtained from a well-known New York broker and analyzed for our tests by Fleming. (221 in Table I.)

The ferro-silicon used by Professor Turner in making his tests, the analysis being published by him. (This iron we have not ourselves tested.) (Marked *b*, in Table I.) The only American ferro-silicon with silicon as high as 10 per cent. that we have heard of as being made regularly is the "Pencost" brand, the producers of which kindly furnished us with all the metal that we needed for our experiments. Nos. 403 and 401 of the table, representing American ferro-silicon, are of this iron. These irons were analyzed for our tests by Mr. Orton and Professor Lord. We add, for purposes of further comparison, four analyses of two well-known brands of Ohio softeners—namely, "Wellston" (*c* and *d*, analyzed by Britton) and "Globe" (No. 178, analyzed by Setterwall, and *e*, analyzed by Orton). We could add analyses of other high-silicon irons, both foreign and American, that we have in our possession; but for the present purposes these will suffice. The following table gives the analyses referred to:

TABLE I.

	No. of test.	Kind of iron.	Silicon.	Combined Carbon.	Graphitic carbon.	Manganese.	Phosphorus.	Sulphur.
Ferro-silicons.	<i>a</i>	Foreign "Govan"....	10.55	1.84	0.52	3.86	0.04	0.03
	221	Foreign (New York broker)	10.62	.....	.....	2.32	.....	.....
	<i>b</i>	Foreign used by Professor Turner.....	9.80	0.69	1.12	1.95	0.21	0.04
	403	American "Pencost"....	12.08	0.06	1.52	0.76	0.48	tr.
Softeners.	401	American "Pencost"....	10.34	0.07	1.92	0.52	0.45	tr.
	<i>c</i>	American Wellston....	6.67	.....	2.57	.....	0.50	tr.
	<i>d</i>	American Wellston....	5.06	.....	.....	.....	0.75	0.05
	178	American Globe.....	5.89	0.30	2.85	1.00	1.11	0.02
	<i>e</i>	American Globe.....	6.64	.....	.....	.....	0.99	tr.

The points which attract attention in this table are:

1. The large proportion of combined carbon in the foreign irons. If this carbon remains in the combined state after the ferro-silicon is added to the foundry mixture, it will tend to harden the resultant casting. The carbon of the American ferro-silicon is in the graphitic state, to begin with, and therefore such irons should be the superior softeners.

2. Manganese in the foreign irons runs much higher than in the American. It is the general belief that manganese acts more powerfully than silicon and in an opposite direction, causing carbon to assume the combined state. If this is the case, a large part of the silicon in the foreign irons would be needed to neutralize the effect of their contained manganese, leaving much less silicon to exert a softening influence upon the combined carbon

of the hard iron which it is expected to soften than would be the case if the manganese were absent. In the American silicon-irons the manganese is so low that the silicon is free to act directly on the combined carbon of the iron to which it is added.

3. The foreign irons are nearly free from phosphorus, while "Pencost" contains about one-half of 1 per cent. and the other American irons which we have mentioned contain about 1 per cent. We may remark that in most foundry mixtures phosphorus will not run below one-half of 1 per cent., and therefore the effect of the phosphorus, added by the use of American ferro-silicon, will not affect the mixture. Such a small quantity of these high-silicon irons is needed to produce desired results that if they contained no phosphorus whatever this use could not reduce phosphorus in the mixture one-tenth below its former amount. Again, perhaps a small percentage of phosphorus in foundry iron may do more good than harm.

4. We observe the high percentage of silicon which these irons, both foreign and American, contain, as compared with the American softeners made in former years. This increase in silicon percentage has led to the name ferro-silicon.

II. *Is the Silicon in the Pig Retained in the Iron when Remelted?*—The high silicon irons are made in a furnace at a very high temperature, and it has been asserted that when remelted in the foundry at a much lower temperature the iron will drop much of its silicon, which will be carried off in the slag. The introduction of these high-silicon irons has led to discussion as to the relative value of softeners with high or low silicon, and also as to the relative economy in the use of a 10 per cent. metal as compared with an iron in which the silicon reaches only half that percentage. We wish it distinctly understood that we discuss in this paper, not the question whether the silicon is oxidized by the blast of the foundry cupola or not, or how much may be lost in that way, but simply whether remelting at a lower temperature will release a portion of the silicon, and, if so, in which iron—that is, high or low-silicon iron, the loss is the less. We have made a number of tests to arrive at the truth. We secured seven pigs of "Pencost" ferro-silicon, containing silicon ranging from 4½ to 12 per cent. These pigs (except the first one) were made at the same furnace and from the same stock, and under the same general conditions, which would insure a similar composition in each, except as to the silicon, and the change in carbon which the variation in silicon would produce. Sets of test-bars were made from each of these pigs and tested by "Keep's Tests"; the crucible temperature being about the same as that of the foundry cupola. These test-bars were then again remelted and a second series of bars was cast and tested. Both the first melts and the remelts were then analyzed, with the results shown in the following table:

TABLE II.

Silicon in original pig of Pencost ferro-silicon.	Silicon in test bars.		Silicon in test bars.		Actual loss of silicon from		Percentage loss from	
	Number of tests.		Number of tests.		First melt.		First melt.	
	First melt.	Second melt.	First melt.	Second melt.	First melt.	Second melt.	First melt.	Second melt.
4.36	397	4.35	405	4.25	0.01	0.11	0.22	2.52
6.76	398	6.75	406	6.57	0.01	0.18	0.14	2.66
8.09	399	8.07	407	7.99	0.02	0.08	0.24	0.99
9.42	400	9.27	408	9.31	0.15	gain	1.56	.....
10.34	401	10.25	409	10.24	0.05	0.05	0.48	0.48
11.34	402	10.82	410	10.76	0.52	0.07	4.58	0.64
12.08	403	11.68	411	11.48	0.40	0.20	3.31	1.71

An examination of these results reveal that on the first melting the irons having

less than 10 per cent. of silicon lost on an average 0.55 per cent., while those containing 10 per cent. and over lost 2.80 per cent. of the silicon held in the pig. On the second melting the losses are twice as great in the low as in the high percentages. From these observations we conclude that though the absolute loss is greater in the higher numbers, it is still so small in all cases as to be unworthy of consideration.

To further prove the question, whether irons high in silicon can hold their silicon when melted at lower temperature, a series of pigs, from an Ohio furnace now out of blast, was tested, and the pigs and bars analyzed. These pigs were all made from the same mixture of ores and represent all the grades of iron made at the furnace. The results appear in the following table:

TABLE III.

No. of test.	Grade of iron.	Silicon in original pig.	Silicon in first melt.	Loss of silicon.
35	Silvery, flaky	6.99	6.92	0.07
34	Silvery, flaky	6.86	6.80	0.06
33	Silvery, flaky	6.82	6.75	0.07
36	Silvery, open	5.66	5.63	0.03
39	A1 foundry	5.15	5.20	+ .05
37	B1 (hot)	4.66	...	...
38	B1 (cold)	4.05	4.00	0.05
40	No. 2 foundry	3.64	3.44	0.20
41	No. 1 mill	3.57	3.59	+ .02
42	White	1.97	1.98	+ .01

The tests show great uniformity in the losses of silicon, which are in all cases trifling. A careful study of these two series of tests of Ohio Silicon Irons, the silicon ranging from 2 to 7 per cent. in the ordinary softeners, and from 5 to 12 per cent in the "Pencost" ferro-silicons, or, taking both tables together, from the white iron, made so by low silicon, to the whitish iron produced by an excess of silicon, leads us to conclude:

1. That silicon pig iron loses practically none of its silicon in remelting through being melted at a lower temperature.

2. That there is practically the same actual (not proportional) loss from irons with comparatively low silicon as with high, and therefore one is as economical as the other so far as the silicon is concerned.

Before leaving the question of loss in silicon due to the lower temperature in remelting, let us compare the losses in foreign with losses in American ferro-silicons. In the following table we exhibit the determinations of silicon in a 16 per cent. ferro-silicon (396), imported by a prominent New York broker; a 12 per cent. metal (213), imported by the same firm; and a 10 per cent. metal (214), imported by a Montreal broker. These samples are sufficient to represent foreign irons, and we introduce Nos. 403 and 401 as representing American ferro-silicons.

TABLE IV.

Number of test.	Kind of iron.	Silicon in			Percentage loss in.	
		Original pig.	First Melt.	Second Melt.	First Melt.	Second Melt.
396	Foreign (New York broker)	16.32	14.47		11.33	
213	Foreign (New York broker)	11.99	10.84		9.69	
214	Foreign "Govan"	9.85	9.81		.40	
403	American "Pencost"	12.08	11.68	11.48	3.31	1.71
401	American "Pencost"	10.34	10.29	10.24	.48	.48

These results show distinctly that these foreign irons lose in remelting more than the American irons with which they are compared. We will not endeavor to account for this in the present paper.

III. *Is the Silicon in the Pig Imparted to other Irons without Loss?*—That is, will ferro-silicon hold its silicon until mixed with irons deficient in silicon; and, for making such mixtures, will high or low-silicon iron lose most silicon? To arrive

at conclusions regarding these questions we made four series of melts. Each series was composed of four casts and each cast of six sets of test bars. We used for these a white-iron base (376) with 0.186 per cent. silicon and a gray-iron base (253) with 1.249 per cent. silicon; and for adding silicon we used the first pig of "Pencost" (397) before spoken of, containing 4.36 per cent. of silicon, and the fifth pig (401), containing 10.34 per cent. silicon.

The first series was gray (376) and 4.36 per cent. of ferro-silicon (397).

The second series was white (376) and 10.34 per cent. of ferro-silicon (401).

The third series was gray "FLM" (253) and 4.36 per cent. of ferro-silicon (397).

The fourth series was gray "FLM" (253) and 10.34 per cent. of ferro-silicon (401).

The four numbers of each series were to contain respectively 1.5, 2, 2.5 and 3 per cent. of silicon. Having been weighed with great care they were melted so as to avoid oxidation, and were cast into bars and tested, when each set of bars was analyzed, with the results shown in the following table:

TABLE V.

Percentage of Silicon calculated to be in Test Bars.	Number of Test.	Silicon found in Bars White (376) and 4.36 per cent. Pencost (397).		Number of Test.	Silicon found in Bars White (376) and 10.34 per cent. Pencost (401).		Number of Test.	Silicon found in Bars Gray FLM (253) and 4.36 per cent. Pen- cost (397).		Number of Test.	Losses of Silicon in White (376) and 4.36 per cent. Pencost (397).		Losses of Silicon in White (376) and 10.34 per cent. Pencost (401).		Losses in Silicon Gray FLM (253) and 4.36 per cent. Pencost (397).		Losses of Silicon in Gray FLM (253) and 10.34 per cent. Pen- cost (401).	
1.50	340	1.49	344	1.48	348	1.50	352	1.53	356	1.01	1.08	1.01	1.08	1.02	1.08	1.01	1.08	
2.00	341	1.97	345	1.92	349	2.01	353	2.11	357	1.03	1.08	1.03	1.08	1.03	1.08	1.01	1.11	
2.50	342	2.55	346	2.42	350	2.43	354	2.41	358	1.06	1.08	1.06	1.08	1.06	1.08	1.08	1.08	
3.00	343	2.95	347	2.87	351	2.88	355	2.86	359	1.06	1.13	1.13	1.13	1.14	1.14	1.14	1.14	
Average deviation from calculated per cent.												.08		.08		.06		.09

A careful examination of this table reveals the following facts:

1. Losses in silicon increase as the percentage of silicon in the mixture increases. That is, an iron deficient in silicon can have its silicon raised to 2 per cent. with less loss than if raised to 3 per cent.

2. Losses are slightly higher when using the 10 per cent. than with the 4 per cent. iron; but the losses are so small in all cases that no commercial discrimination can be drawn in favor of one class over another in the matter of economy of silicon. In the extreme case of melting a white iron and a 10 per cent. silicon metal together, to produce a dark, soft foundry iron, there was no excessive loss in silicon.

IV. *General Conclusions.*—We may draw from the results presented the following general conclusions:

1. Pig irons of any grade may be melted and cast without excessive loss in silicon or excessive change in chemical composition.

2. Ferro-silicons lose in remelting a little more silicon than do the softeners containing less silicon; but the difference is so small that commercial distinction is not possible.

3. In alloying silicon irons with scrap or pig iron deficient in silicon, the silicon is practically all retained in the mixture, and no economy in silicon results from the use of one class of American silicon iron over another.

4. American ferro-silicon, so far as we have investigated, is more economical than the imported, and probably, in most cases, softens to a greater extent.

We think that we have accomplished what we set out to do. Our discussion is altogether from a chemical standpoint, and we have proved that the founder can produce a desired grade of casting by compounding suitable irons, as cheaply, if not more so, than by purchasing iron in which the combination is already what he desires. As soon as we can prepare a report upon

the physical characteristics of these irons and the mixtures that we have made, we shall publish such results.

The Denver Castings Contract.

The *Evening Post* of November 26 publishes the following:

"The *Iron Age* has another article, and we are constrained to say a disingenuous one, on the contract for 5000 tons of iron castings taken by an English firm for delivery in Denver, Col., in competition with Chicago firms bidding for the same work, the English firm having to get over a duty of 1½ cent per pound, or \$28 per ton, as we had computed it. We usually defer to trade journals in matters relating to their specialties, but in this case we discover such glaring errors that we cannot allow them to be passed over in silence. The contention of *The Iron Age* is that the duty on these castings is not 1½ cents per pound, at which rate, it says, they could not be imported at all, but is 45 per cent. ad valorem, a much lower rate. It computes

the equivalent of 45 per cent. ad valorem at \$9.31 per ton, while the duty at 1½ cents per pound would be \$25 per ton of 2000 pounds, the contract being for "short" tons, instead of English long tons. The *Evening Post* is chided for making a mistake about the number of pounds in the ton under this particular contract—as though that could make any difference in a case where the rate of duty is so much per pound, and when the tariff does not deal with tons at all. In order to dispose of this branch of the subject, we will state, once for all, that the contract, as described, is for 10,000,000 pounds of iron castings, and that the total duty at 1½ cents per pound is \$125,000.

"Now, as to the contention of *The Iron Age* that the rate of duty under the law is 45 per cent. ad valorem, and that this is a lower rate than 1½ cents per pound would be, we have examined the law very closely, and also several compilations of the tariff, official and unofficial, and we find no authority for the statement of *The Iron Age*, and we now challenge it to produce any. The law says:

Cast-iron vessels, plates, stove-plates, and irons, sadirons, tailors' irons, hatters' irons, and castings of iron not specially enumerated or provided for in this act, 1½ cents per pound.

It is certain that castings of iron for cable railway companies are not specially enumerated or provided for in this law. Therefore, they must be dutiable at the rate of 1½ cents per pound, and not as 'manufactures of iron not otherwise provided for,' which are dutiable at the rate of 45 per cent. ad valorem. And here we encounter another remarkable discrepancy between *The Iron Age's* calculations and those of official publications at Washington City. The Senate Subcommittee on the Tariff prepared and published, only two months ago, 'A Comparison of Tariff Schedules' to accompany the bill presented by them as a substitute for the Mills bill. On page 103 of this

document they state that the ad valorem equivalent of the present specific duty on iron castings is 30.78 per cent., which is lower than the rate on iron not otherwise provided for, instead of being higher, as *The Iron Age* contends. They show how they reach this conclusion by giving the number of pounds imported in the fiscal year 1887 (693,322) the value (\$28,154) and the duty collected (\$8666). Anybody can calculate for himself that a duty of 1½ cents per pound on the number of pounds here given amounts to \$8666, and that 30.78 per cent. of the stated value thereof is also \$8666. We leave *The Iron Age* to grapple with the Senate Committee and also with their proposed reduction of the duty on iron castings, which the Mills' bill leaves untouched."

The *Evening Post* misrepresents us when it states that we claim that the duty is not 1½ cents per pound, but is 45 per cent. ad valorem. Our position was that the business was impossible at 1½ cents per pound duty, and that therefore those who imported the castings must necessarily make the effort to secure the 45 per cent. ad valorem rate. In *The Iron Age* of November 1, page 671, we put the matter in the following language:

"An interesting question arises as to the rate of duty which will be paid on these castings. They consist mainly of yokes, so shaped as to support the track rails on their extended arms, the slot rails on central uprights, and the cable tube in an oval base. If they are wholly of cast iron it is difficult to see how they can pass the custom house at any other rate of duty than 1½ cents per pound under paragraph 157 of the Indexed Tariff. As it is asserted, however, that they will be imported at 45 per cent. ad valorem, it is probable that they will be changed slightly from the condition of mere castings, so that they can be brought in as manufactures of iron under paragraph 216. If the duty of 1½ cents per pound should be imposed, it is evident upon very superficial computation that it would be impossible to import them at the price at which they are to be delivered. These facts will develop in time, as the occurrence is so important that it will not be allowed to pass wholly out of sight by the foundrymen interested."

The *Evening Post* previously referred to the article of which the above is a part, so that it is difficult to escape the conclusion that it has attempted deliberate misrepresentation in order to assume the airs of superior knowledge. It seems almost superfluous to reply to the marvelous discovery which the *Evening Post* has made of figures published in the document of the Senate Finance Committee to which it triumphantly refers. The very small quantity of castings imported are made up of small articles. If our contemporary had done a little more figuring it would have discovered the difference. The 693,322 pounds were valued at \$28,154, which is equal closely to 4 cents a pound, or \$80 per ton, while the yoke castings were quoted under \$39, delivered at Denver, with a \$7 rate of freight to be deducted. Evidently the material imported is of a very different class than heavy yoke castings. The very fact that imports could be made proves that the articles must be high-class castings. To parade percentages under such circumstances certainly does not display a high order of intelligence.

As we announce elsewhere, the contract has gone to an American concern ultimately, so that the incident may be regarded as closed. It has served to show, however, what contortions a newspaper will undergo to avoid acknowledging an error when it has the misfortune of laying claim to infallibility.—*Editor Iron Age*.

The Pennsylvania Steel Company will build a steel works to consist of three 12-ton converters at Sparrow's Point, Md.

Brass Making in Waterbury.

Among the many manufacturing villages and towns strung along the Naugatuck Valley down to Bridgeport, Conn., Waterbury is the largest. Added to its scenic charms, the Naugatuck Valley possesses strong attractions to those deeply interested in witnessing the evidences of a busy, prosperous community. There are few traces of the squalor and the harsh surroundings which characterize the majority of manufacturing towns. There is an air of neatness and of prosperity which is, unfortunately, beginning to desert New England, of which it was once generally characteristic. It is a record of which both employers and employees may well be proud, and which is more eloquent than any favorable impressions created on a first visit to the town that Waterbury's industrial history chronicles but one strike.

One of the leading industries of the Naugatuck Valley, of which it once had the monopoly and still commands the control, is the manufacture of brass and copper. The greatest number of mills in any one place are concentrated at Waterbury, which is practically supported by the brass industry and allied or tributary branches of manufacture. It is stated—and casual observation seems to bear out the claim—that there are few working communities in which the average wealth is so high. The blessings of industry and enterprise appear to have been, more than usual, shared by the many instead of being concentrated in the hands of a few. While they are largely the accumulations of the last generation, the foundations for it were laid as early as the beginning of this century, when the Grilleys, three brothers, began the manufacture of brass buttons, finishing the rolling in a set of 2-inch rolls driven by horsepower. From an interesting illustrated volume entitled "Waterbury and Her Industries," by Homer F. Bassett, published by the Lithotype Printing and Publishing Company, of Gardner, Mass., we take the following historical data: In 1802 Abel Porter & Co. began the manufacture of gilt buttons, and under the successive names of Leavenworth, Hayden & Scovill, J. M. L. & W. H. Scovill, and the Scovill Mfg. Company developed into a very large manufacturing concern. From the same beginnings the Benedict & Burnham Mfg. Company developed, brass rolling being commenced in 1825. The next to follow was the Waterbury Brass Company, whose first sheet was rolled early in 1846. Holmes, Booth & Haydens was organized in 1853, the leading spirit in the concern subsequently forming the Holmes, Booth & Atwood Mfg. Company in 1869, the name of the company being changed in 1871 to its present style, the Plume & Atwood Mfg. Company, whose rolling mill is, however, located at Thomaston. The fourth brass mill of the town is that of the Waterbury Mfg. Company.

The renown of the parent industry, the brass manufacture, has been overshadowed, however, so far as the celebrity of the town is concerned, by the manufacture of clocks and watches. Wooden clocks were made as early as 1790. The production of brass clocks was begun as a branch of the Benedict & Burnham Mfg. Company, but separately organized in 1857 as the Waterbury Clock Company. It is to the enterprise of the same firm that the last and most famous industry of the town was established in 1880, the manufacture of watches by the Waterbury Watch Company. Among the other subsidiary industries is the manufacture of pins by the American Pin Company, curtain trimmings by the American Ring Company, fancy metal goods and buttons by the Steele & Johnson Mfg. Company, the Lane Mfg.

Company, plated ware by the Rogers & Hamilton Company and Rogers & Brother. Randolph and Clowes manufacture brass tubing as a specialty, and Blake and Johnson produce rivets, pins and screws.

The water-power obtainable from the Naugatuck River was probably the inducement which tempted the early manufacturers to locate along its banks. Even to-day it is a factor in some of the works. The rolling mill of the Waterbury Brass Company, for instance, being partly driven by a large wheel. Like in the majority of the inland manufacturing towns of New England, the fuel question is quite serious, coal being rendered relatively high. Thus the Naugatuck Valley Railroad charges \$1 per ton for the haul of 30 miles from Bridgeport to Waterbury. The Meriden, Waterbury and Connecticut River Railroad has been extended lately to Cromwell, and hauls coal for 80 cents. The freight in manufactured goods to New York is 13 cents per 100 pounds, and 25 cents to Chicago. In spite of the fact that the raw materials, copper and spelter, come chiefly from the West, so that Naugatuck Valley manufacturers may have against them in the future the cost of transportation from there on stock, and to the West on goods; in spite of the fact that their fuel is comparatively high, Naugatuck Valley manufacturers do not for the present see any dangers in the possibility of serious competition for the Western trade from local manufacturers there.

THE BRASS MAKERS AND THE SYNDICATE.

The manufacturers of Waterbury complain bitterly of the effects upon their business of the operations of the French copper syndicate. All of those whom we saw agree in stating that consumption has fallen off very materially, and that even in the direction of electrical wire, where no decrease might be expected, the demand in 1888 has not been as heavy as it was in 1887. It is possible, however, that the fact that a number of iron wire drawers have entered into the manufacture of copper wire may account for this fact. No such explanation is possible when dealing with the many other channels of consumption. We have been cited a number of articles for which formerly brass was used in other industries in which the alloy has been entirely superseded by other sheet metals, principally steel. This substitution has been aided by the advances in the manufacture of the latter, with special reference to its undergoing the strains incident to drawing and shaping cold in different ways. Unlike the copper manufacturers, who have succeeded in maintaining a trade combination, the brass makers have for a number of years been engaged in a sharp competition, which had lowered prices in some lines even below cost of manufacture. Knowing, as every one who has watched the growth of copper mining in this country, that the operations of the syndicate were carrying values far above the normal figure, the brass manufacturers of the Naugatuck Valley resisted the rise with all the power in their command. They did not believe that it was more than a wild speculation doomed to an early collapse. In the fancied security, which a large amount of raw material bought at low prices gave them, they held off. Competition forced them all to meet the prices for manufactured goods, which the most skeptical of all chose to set. They claim that even to-day, after every vestige of all low-priced raw material has disappeared, and all are working on dear stock, their prices of product have not risen enough to compensate for high copper. They claim that an unsatisfactory state of affairs before the rise has become intolerable since then. They have lost both in trade and whatever margin there may have been has been further reduced. The managers of the works in the

Naugatuck Valley must come before their stockholders with the tale of a very unsatisfactory year, to which is added another serious consideration. A visitor to any brass mill will be struck with one fact—the large amount of metal which is in course of manufacture. In other words, the many operations through which the raw material must pass before it is shipped keeps a large floating stock in rotation. In the annual inventories this must be a serious item. Is the manufacturer wise who enters it at present cost, with the conviction that at some future time, possibly during the new fiscal year, when the inevitable crash comes, it may be worth only one-half of what was actually paid out for it? Is it safe to pay dividends, if he has earned any, when the value of his stock from the ingot to the goods in his warehouses and in the hands of his agents may decline one-half in a single day? Is it expedient to draw funds from a business when he can be confronted at some future time with engagements for the purchase of several months of supply of raw material at a fancy price, with customers using right and left every artifice which a phenomenal decline brings out to escape from accepting and paying for goods bought? The brass manufacturers did not reap any advantages from the advance; they are suffering under the present high level of prices, and must ultimately face a certain loss, against which they have no means of protecting themselves.

On the whole those of the works visited were fairly well engaged, although disappointment at the volume of business was quite freely expressed. The fact that some parts of the plants visited showed some idle machinery bore out the statements made. It is probably only natural that employment should be somewhat fitful. It is only natural when the fact is taken into consideration that buyers will not do more than cover their immediate wants. The result is that orders usually are relatively small, and that when they come they are coupled with the demand for immediate shipment. The trade naturally endeavors to throw upon the manufacturers the burden of carrying the stocks. The latter prudently keeps it as close as possible down to the minimum. In an industry in which the number of articles produced is very large the present condition of affairs adds to details already fairly bewildering, and must to some extent increase both the manufacturing cost and the general expenses.

Any effort to describe the methods of manufacture employed would be inadequate without numerous illustrations of machinery, of which a great part is of special design, developed for some one specific purpose, and often the jealously guarded property of one particular works. When we add that a rapid inspection of nearly any one of the plants alone is the work of hours, we need offer no apology for not making any attempt at a description of any individual concern.

The metals composing the alloy are melted in plumbago crucibles in ordinary melting holes, with hard coal as the fuel, the alloy being cast into bars of different shapes in iron split molds, which can be readily taken apart. Generally speaking, the feeling among brass-makers seems to be that it is in these departments of their business that least progress has been made. We have been told by one connected with the business for over a generation that today practically the same methods are employed which were used 30 years ago. There seems to be considerable irregularity in the product, even when the operation of casting is conducted by the same man. The principal defect is the presence of blow-holes, apparently distributed irregularly over the surface and

partly throughout the metal. One of the manufacturers expressed the conviction that if the subject were taken up in a thorough manner and investigated scientifically some means could be secured of arriving at the desirable aim of casting thinner bars without flaws. This would lead to a notable reduction in the cost, since then the number of passes necessary to reduce the thickness to the gauge aimed at would become less, and a tedious and expensive operation—that of overhauling—would be avoided. The latter consists in scraping out bodily by hand or special machine scrapers those parts of the partially rolled bars which show defects.

The rolling mills do not differ in any material respect from the same character of machinery employed in other branches of sheet-metal manufacture, except that, on the whole, they are run at slow speed and the product is handled almost entirely without the use of machinery before and behind the train. During the process of rolling down the metal must be repeatedly annealed, the apparatus used for this purpose being large ovens which are almost exclusively heated by wood. The brass manufacturers have found that the use of mineral fuel in a solid form is impossible because the sulphur in it tends to injure the quality of the metal. We understand, however, that one of the mills is now building an experimental gas furnace with a view to superseding the more expensive wood by gas. As we have already stated, it is necessary, during the breaking down, to overhaul the bars to remove defects. The final products of the rolling mill are sheets and strips of brass, a large part of which is marketed in that form, while a very important proportion of it is cut up in the mills themselves in developing a large line of special manufactures to which we shall refer later.

The manufacture of wire does not differ materially from that in iron and steel, except that the first operation from the bar is to divide the latter into a series of square bars by putting them through slitting machinery. Annealing, tumbling and pickling become necessary in different parts of the operation.

The third special line of producing what may be called raw material is the manufacture of tubing, either soldered or solid drawn. For the former ordinary clutch benches are employed, while for the manufacture of the latter hydraulic drawing benches are used. By employing special dies corrugated and other shapes are made, and by special machinery fancy rods are produced.

It is, however, in the further manufacture of sheet brass that the largest amount of special machinery is employed and a vast variety of articles are made in an ingenious manner. Drawing presses of varying designs, punches, screw-threading, spinning and polishing machinery are used to manufacture a great variety of articles, among which are prominent lamp trimmings and fixtures. We had occasion, too, to watch the practically automatic manufacture of jack chains, the production of brass and steel pins and the ingenious machinery for papering them at the works of the Plume & Atwood Mfg. Company. We saw a number of rivet machines at work, and inspected the machinery used for single and double wrapping electric copper wire and the manufacture of KK electric wire at the Holmes, Booth & Haydens Works. Taken altogether, it is in this department, in the cutting up and shaping of brass that Yankee ingenuity has displayed to greatest advantage its far famous achievements. It has been aided in it by the exceptional quality of the metal used, which is capable of standing a large amount of torture.

The capacity of the Sable Iron Works, Zug & Co., will shortly be increased.

Multiple Expansion Engine Cards.

Mr. H. W. Spangler, in a paper on "Multiple Expansion Engine Cards," recently read before the Engineers' Club of Philadelphia, remarked:

The object of combining indicator cards from multiple expansion engines is to show whether the proper relation has been maintained between the pressure and the volume during the entire action of the steam, and what proportion of work we have lost by using separate cylinders.

It is essential that the cards shall be placed in such a position that if the pressure and volume are co-ordinates, the points thus indicated are those actually obtained from the cards. This necessitates that the length of each card should be proportioned to the volume swept through by the corresponding piston, and each one should be set at a distance from the vertical line proportional to its own clearance. It is only by this method of setting the cards that the co-ordinates indicate pressure and corresponding volume. A common method of combining cards is to make their length proportional to the volume swept through by the piston and bringing them all to the same vertical line. These cards are of no more use than the original ones, as the indicated horse-power alone can be determined from them. Still another method is to make the expansion and compression lines in two successive cards meet on the initial pressure of the second one. The error in the reasoning by which this method was arrived at is that the same amount of steam (as steam) is not necessarily present in the two cylinders.

Invisible Torpedo Boats.—A serious drawback in torpedo boats is the emission of smoke and sparks from their funnels, which is almost certain to disclose their whereabouts to an enemy at night. To remedy this evil Messrs. Yarrow, the well-known torpedo boat builders, a few years ago constructed a torpedo boat for the Spanish Government, in which two smoke ports were provided, one on each side of the vessel, about 15 feet from the bow. Each of the ports was fitted with a damper, under the control of the steersman, who could direct the products of combustion through one or the other at will. On approaching an enemy the smoke would be directed through the port on the unexposed side of the vessel. With this arrangement some inconvenience was experienced by the crew from the heated gases, &c., being carried along the deck at times by the wind. Attention has recently been drawn to an apparatus invented by M. Oriolle, and which was tried a short time ago at Rochefort Arsenal. By means of this device the smoke undergoes such a change in the smokestack that the flames and sparks entirely disappear from the funnel. The smoke spreads horizontally over the surface of the water and envelopes the boat in a dense mist, impenetrable to the electric light. This invention is said to have proved satisfactory in every way, and will render torpedo boats at night absolutely invisible.

A Spanish industrial paper, in an article on the exhibits of English machinery at the Barcelona Exhibition, lays special stress on the fact that the exhibitors of cotton spinning machinery not only showed the newest inventions in actual motion, but allowed manufacturers and others who wished to test the inventions to bring their own raw material for the purpose. This concession on the part of exhibitors, the quoted authority says, has done a great deal to influence Spanish manufacturers in favor of English machinery.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington street, CHICAGO, November 28, 1888.

Pig Iron.—Sellers report increased activity, more confidence being shown by buyers. Although a heavy business is not expected until December, at the present rate of increase the anticipated demand will strike the market very early in the month instead of toward the close. For the first time in several weeks the leading houses unanimously report a good volume of business, but with some of them trade was confined to small lots. The largest orders for Coke Pig Iron placed during the week were actively contested among the sellers, and, although prices were generally well maintained, a Southern company was, as usual, found willing to make an abatement. The other Southern companies do not seem disposed to follow suit at present, and such occurrences only serve to emphasize the general strength of the market. But a short time since such a concession would have extended all along the line. Soft Coke Irons are a little dearer wherever any change has been made. The car-wheel makers have made no purchases during the week so far as known, but a good trade is expected in that direction very soon. We quote as follows for cash, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1 and 2, \$20; Nos. 3 to 6, \$20.50 @ \$21; Alabama Car-wheel, \$26.25; Jackson County Softeners, No. 1, \$18.60; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband), No. 1, \$20.50 @ \$21; other Ohio Soft Irons, No. 1, \$17.50 @ \$19.50; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$18; No. 3, \$16 @ \$17; Coke Bessemer, \$17.50 @ \$18; Southern Coke, No. 1 Foundry, \$17.50; No. 2 Foundry and No. 1 Soft, \$17; No. 3 Foundry and No. 2 Soft, \$16.25; Gray Forge, \$15.50.

Bar Iron.—The wagon-makers are asking for bids on large quantities of material for their use, and jobbers have also bought heavily of the mills. Some Car orders have been placed, but not large lots. The mills are finding much difficulty in filling orders promptly, especially on Guide Irons. The heavy demand and better price realized for Muck Bar will probably cause some of the mills now selling Bar Iron in this market to pay still less attention to the finished product, which cannot but have a favorable influence on prices. The Mahoning Valley mills are holding firmly to 1.65¢ at mill, and the most diligent search is necessary to find other mills willing to do a little better. About 1.75¢, half extras, at Chicago, is now the ruling price for mill lots of Common Iron. From store small lots are to be had at 1.85¢ @ 2¢, according to quantity and quality.

Structural Iron.—The business in this line referred to last week has not yet been placed. Prices are unchanged, mill orders being quoted as follows, f.o.b. Chicago: Angles, 2.15¢ @ 2.20¢; Universal Plates, 2.25¢ @ 2.30¢; Tees, 2.55¢ @ 2.65¢; Beams and Channels, 3.40¢. Small lots from store sell at 2.35¢ @ 2.50¢ for Angles, 2.60¢ @ 2.70¢ for Tees, and 3.80¢ for Beams.

Plates, Tubes, &c.—Trade has been fairly active during the week in small lots from regular consumers. This is largely attributable to repairs that will be necessary on tugs and lake steamers, which will go out of use with the closing down of navigation this month, and the cessation of operations on saw mills at an early date. Boiler makers report very light demand for new work, which makes their small

purchases from store stock a desirable trade to jobbers, who in this way dispose of much of the accumulated odds and ends. Store prices are reported firm, with a tendency to advance. Manufacturers are slow to accept large contracts for future delivery at prices they have been naming for the past three months. Mills generally report a good supply of orders, and are holding off on further contracts in the hope that they will secure higher figures for next year's delivery. The low-priced mills that were in the market several weeks ago have obtained all the orders they want. The demand for Heavy Sheets, Nos. 10 to 14, remains strong and prices firm at 2.60¢ @ 2.70¢; Tank Iron, 2.60¢ @ 2.70¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron, 4.25¢; Flange Steel, 3.75¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢. Boiler Tubes are reported firm at 60 % off.

Sheet Iron.—There continues to be an active demand for Light Sheets. A prominent jobber reports that on an average he turns away daily orders aggregating from 5 to 8 tons in pick-up lots. Orders that were placed with mills in September in many cases have not yet been delivered. In quantities suitable for stove pipes and other unimportant manufactures stocks are a little more plentiful. In small lots jobbers quote No. 24 at 3.10¢; No. 25 and 26 at 3.20¢, and No. 27 at 3.30¢. Ten cents a hundred advance on these figures could be obtained if the stock was within reach.

Galvanized Iron.—The excellent demand for Galvanized Iron that has existed for some time past has thoroughly broken stocks, and jobbers find great difficulty in supplying the demand from the smallest trade. The shortage is chiefly found in the lighter gauges from No. 24 up. So long as the demand for Black Sheets remains so great there is very little chance for relief in the Galvanized grade. Jobbers do not anticipate that their stock will be fully replenished during this season, and are doing their utmost to accommodate their customers from stocks on hand. Prices are quoted firm at 60 % and 5 % off on Juniata, and 60 % and 10 % off on Charcoal.

Merchant Steel.—While the week has been quiet in most lines, some good contracts have been placed for special shapes and qualities. The mills making Crucible Plow Steel are busy and prices are firm. Soft Center Steel is in light demand, but a better trade is being done than for two months previously. Solid Crucible Steel is now largely taking the place of Soft Center. The Open-Hearth manufacturers have apparently taken all the orders they want at low prices, and are disposed to ask more on future contracts, but Crucible Spring Steel is weaker, and a buyer of 50 to 100 tons could secure a decided concession on quotations. Bessemer Bars are lower, mill orders having been taken at 1.90¢, f.o.b. Chicago. We quote as follows from stock: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8.50¢ @ 9.50¢; Specials, 13¢ @ 25¢; Crucible Spring, 3.75¢; Open-Hearth Spring, 2.50¢; Open-Hearth Machinery, 2.40¢ @ 2.75¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—The condition of the market remains as heretofore reported. The demand is only for lots ranging from 500 to 1000 tons, and the mills in operation have scarcely sufficient work on hand to keep them going. Mills are making a nominal quotation of \$30 per ton, but in the light of some larger orders that were placed in Pittsburgh recently this figure can hardly be considered a market value for large buyers. Competition between established mills is exceedingly strong, and the opening of a new one in the early future with improved machinery has been

largely instrumental recently in testing the extreme weakness in the Steel Rail market. It is reported that a meeting of the Steel Rail Association will be held in New York on the 26th inst., for the purpose of adjusting prices and making allotments.

Old Rails and Wheels.—Among buyers there has been an indifferent inquiry for light weights, with very little demand for standard weights. Some 3000 tons have been offered during the week, but at figures which are from \$1 to \$2 a ton above what consumers are willing to pay. A nominal quotation for this market would be \$23 @ \$23.50. Old Steel Rails, long lengths, are quoted \$19.50 @ \$20; short lengths, \$17. There is nothing doing in Old Car Wheels. Dealers are asking \$19.50 @ \$20. The supply, however, is considerably larger now than it has been for some weeks, and it is probable that a movement will occur soon in this branch of trade.

Scrap Iron.—We hear of sales aggregating about 400 tons of No. 1 Forge at \$21. The demand is only in small lots for this grade and very little inquiry for anything else. Dealers' prices for selected stock are as follows per ton of 2000 lb: No. 1 Forge or Railroad Shop, \$21; Track Scrap, \$19.50 @ \$20; Horseshoes, \$20; Axles, \$26; No. 1 Mill, \$15.50; Pipes and Tank, \$13; Light Wrought, \$11; Cast Machinery, \$14; Stove Plate, \$12; Cast Borings, \$9; Wrought Turnings, \$12.50; Axle Turnings, \$14.50; Coil Steel, \$15; Leaf Steel, \$16.50; Locomotive Tires, \$16 @ \$17; Mixed Country Scrap is quoted at \$14 @ \$15.

Hardware.—The Shelf Hardware trade has been unusually active during the past week, some of the local houses having been obliged to work their force at night to keep up with the rush of orders. The demand is very general, invoices covering every variety from staple to holiday goods, House-Furnishing Wares, Builders' Hardware, &c. The open weather is doubtless enabling a great deal of outdoor work to be prosecuted now which would in ordinary seasons have been postponed until spring. In Heavy Hardware an opposite condition of affairs prevails. The demand is light and trade is very disappointing; still, this is usually to be expected at this time. No changes in prices are reported except in Shot, which has been marked down to correspond with the drop in Lead. It is now quoted at \$1.15 regular and \$1.10 for quantity. Solder is unchanged.

Nails.—Inquiries from large buyers for prices on next year's deliveries are increasing, but manufacturers are not meeting their views in this respect. For immediate delivery prices of Steel Cut Nails are down to an extremely low point, some of the manufacturers being evidently weary of carrying large stocks in their warehouses and desiring to convert the same into hard cash. But buyers hold off in such cases, expecting to place orders at still lower figures. The impression is growing that the time to buy is at hand, and that the turn of the year will see materially higher prices. The low prices now being quoted are accompanied with a proviso that specifications shall average considerably above the base. The removal of this restriction will probably set the ball in motion. But the large stocks now in first hands will then be in second hands, purchased at very low prices, ready to be pushed out at every opportunity, and what advantage will the manufacturers reap from the higher price which is to follow? Steel Nails are now selling at \$1.95 from stock, and cirloads on track at \$1.90. Jobbers report a fair demand in a small way, with sales nearly equal of Steel and Wire Nails. The latter are still sold at \$2.60 in small lots, and are firmly held.

Barb Wire.—A meeting was held at Cleveland, on Friday last, of prominent manufacturers. It was not a general meeting of the trade, but a preliminary meeting to lay the foundation for a plan which will be thought effective to extricate the business from its present unsatisfactory condition. The manufacturers are not selling much Barb Wire at present, but those who are running their works are accumulating large stocks in their warehouses, for which they anticipate a good demand early in the coming year. If the price can be advanced meanwhile they will be well situated to realize the full benefit. Jobbers are still quoting small lots at 2.90¢ for Painted and 3.60¢ @ 3.65¢ for Galvanized.

Pig Lead.—A contract for furnishing 100 tons to the Department of Public Works was let, on Friday, to E. W. Blatchford, at 3.54¢.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St. }
PHILADELPHIA, Pa., November 27, 1888. }

The past week has not been of a very decided character, and it is as difficult to indicate the course of the market now as it has been at any time during the entire year. Generally speaking, the market is dull, but prices cannot be called weak, although in some cases there is a willingness to shade a trifle, sooner than lose a good-sized order. But mills and furnaces are so well sold up that there is no actual necessity for immediate business, hence there is a feeling of indifference unless orders can be had on fairly satisfactory terms. As to the future, neither side seems disposed to trade much beyond the current year. Sellers would doubtless accept offers at about current rates for January deliveries, although they are not seeking business, hoping that consumers will take the initiative. This they are not inclined to do at present, and probably will not until they can form some fairly correct idea as to what their requirements will be during the early part of the coming year.

Pig Iron.—Has shown a fair degree of firmness, considering the general apathy of buyers. It can only be accounted for on the supposition that consumption is in full proportion to production, as there are no inconvenient accumulations of stocks either at mills or furnaces. The ultimate course of the market, therefore, is contingent upon the amount of new business coming in to replace that which is now almost completed. Upon this point it is extremely difficult to pass an opinion. As already stated, the conditions are favorable for a large business during 1889, but whether it will be offered in time to prevent any serious weakening in prices remains to be seen. Furnaces keep blowing in all the time, and instead of waiting for the demand to pick up again the supply is steadily increasing, which is not a hopeful feature under the circumstances. Part of the hesitancy among buyers is probably due to this fact, although they will not delay placing orders if they find that their requirements are likely to be of important dimensions. Meantime the market is hesitating and waiting, as it has been for the past three or four weeks, thus far neither gaining nor losing to any appreciable extent. It is worthy of notice, however, that recent reports from the offices of *The Iron Age* in Chicago, Cincinnati, Pittsburgh and other important centers are of a uniformly favorable character, which if confirmed by events in the near future will give strong support to this and other markets on the seaboard. Quotations remain same as last week—viz., \$16 @ \$16.50, at tide, for Gray Forge; \$17 @ \$17.50 for No. 2, and \$18 @ \$19 for No. 1 Foundry.

Blooms.—There is a good deal of business in Steel Blooms, one lot of over 2000 tons for rolling into shapes having been placed at about \$30, delivered to consumer's mill. Ordinary quotations are about as follows: Steel Nail Slabs, \$29 @ \$29.50, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 7/8 "bloom" ton of 2464 lb.

Muck Bars.—Prices are a little irregular, and, on the whole, hardly as firm as they were a week ago. Sales are chiefly at about \$30, delivered, although some hold for \$30.50. Mill quotations may be given as \$29 @ \$29.50, f.o.b. cars.

Bar Iron.—Sellers appear to be a little more disposed to meet the demand, and prices are somewhat easier than they were a week or two ago. Local mills are all fairly busy, but Western Iron is being offered at low prices, hence more or less weakness in the general market. A heavy consumption of Bar Iron is going on, and, from present appearances, there is no reason to apprehend any material change in price, although in the meantime buyers of large lots are in a position to command concessions of from a half tenth to a tenth for deliveries during the current year. For next year's deliveries there is more disposition to hold on to present quotations; hence, for the moment, there is comparatively very little business doing. Sellers' asking prices are from 1 8¢ to 1.9¢ for Bars and 1.95¢ for Grooved skelp, with sales at about these prices for small lots, and at fractionally lower figures in special cases.

Plate and Tank Iron.—Business is a little quiet, although mills are fairly busy for the present. The outlook is not specially promising at the moment, but it is thought that a great deal of work will be on the market after the holidays. The shipyards are again in the market for about 1000 tons of Plates, and while there is some anxiety to secure new business, prices are not likely to be shaded beyond what is usual on orders of this class. Quotations about as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.25¢ @ 2.3¢; Shell, 2.7¢; Flange, 3¢ @ 3 1/4¢; Fire-Box, 3 1/2¢ @ 4 1/2¢.

Structural Iron.—The demand is very slow at the moment, and some of the mills are beginning to want orders. Prospects are said to be moderately good, but there may not be much done until after the holidays, so that prices, while somewhat irregular, are nominally about as follows: 2.05¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand is not important, but with greatly reduced stocks, prices are fairly maintained. The best makes in small lots are quoted as before:

Best Refined, Nos. 26, 27 and 28... 3 1/4 @ 3 1/2¢
Best Refined, Nos. 18 to 25... 3 @ 3 1/4¢
Common, 1/2¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28... 4 1/2 @ 4 3/4¢
Best Bloom Sheets, Nos. 22 to 25... 4 @ 4 1/4¢
Best Bloom Sheets, Nos. 16 to 21... 3 1/2 @ 3 3/4¢
Blue Annealed... 2.8 @ 3¢
Best Bloom, Galvanized, discount... .62 1/2 %
Common, discount... .67 1/2 %

Merchant Steel.—The demand is about as usual, at prices as follows: Tool Steel, 8 1/2¢; Machinery, 2.6¢; Crucible Spring, 4 1/2¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—The market is dull, and while there is a good deal of business in prospect, buyers appear to be in no hurry to place orders. Quotations remain at from \$28 to \$28.50, at mill, but it is said that these figures are for winter deliveries, beyond that many manufacturers are talking higher prices.

Old Rails.—Business is quiet, owing to the scarcity of Rails, but prices are very firm. There are buyers at \$23.50, Philadelphia, but holders are asking all the way from \$24 to \$25 for lots in store, and \$24.50 for shipments. It is likely that \$24 could be obtained for fair sized lots, good delivery, but the feeling is somewhat unsettled, so that there is no saying what a day might bring forth.

Scrap Iron.—The demand keeps pace with the supply, hence prices are fully maintained, and may be quoted as follows: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought Iron Pipe.—The demand seems to have been pretty well satisfied, and large lots are not saleable, unless on special terms. In ordinary transactions, discounts are irregular, but nominally as follows: Black Butt-Welded, 52 1/2 %; Galvanized do., 42 1/2 %; Black Lap-Welded, 62 1/2 %; Galvanized do., 52 1/2 %; Boiler Tubes, 60 %.

Nails.—The building season is about over, hence there is not much demand for Nails at present. Prices are more uniform than they have been for some time, although the large concerns are closely watching their trade, and meeting any cuts that are made outside of legitimate bounds. Store prices, \$1.90 to \$2.

Louisville.

LOUISVILLE, KY., November 26, 1888.

Pig Iron.—There has been steady buying during the week, and one large transaction for several thousand tons, consisting of Mill and Bright Irons, was made. The market is holding its own, and is as strong as any time during the last 10 days. The decline of 20¢ 7/8 ton in freight rates does not affect the market, as it is understood the recent advance was hardly justified, and the present rate is as high as should have been put into effect. There is a strong demand for Brights and Southern Silvery Irons, which are scarce, as most of the furnaces are running on Foundry grades, and it is reported that one furnace at Birmingham has made as much as 80 % of Foundry Iron for some time, showing much better work than they have done in the past.

Southern Coke, No. 1 Foundry, new classification.....	\$16.50 @ \$17.00
Southern Coke, No. 2 Foundry, new classification.....	16.00 @ 16.50
Southern Coke, No. 3 Foundry, new classification.....	15.50 @ 16.00
Gray Forge.....	15.00 @ 15.50
White and Mottled, different grades.....	14.00 @ 14.50
Silver Gray, different grades.....	15.50 @ 16.50
Southern Charcoal, No. 1 Foundry No. 1 Mill.....	17.75 @ 18.25
Southern Car-Wheel, standard brands.....	18.00 @ 17.00
Southern Car-Wheel, other brands.....	22.75 @ 23.75
Hanging Rock Coke, No. 1 Foundry.....	19.00 @ 21.00
Hanging Rock Charcoal, No. 1 Foundry.....	17.00 @ 17.50
Hanging Rock, Cold Blast.....	20.75 @ 23.00
Hanging Rock, Warm Blast.....	22.00 @ 25.00
	19.00 @ 20.00

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. }
CINCINNATI, November 26, 1888. }

Pig Iron.—The local market for Pig Iron during the week under review has continued active, but the volume of transactions in the aggregate has not been so great. A strong tone has prevailed and full prices have been realized, but there has been no advance of moment obtained over the rates current a week ago, although for sales made on several months' time a proportionate advance has been realized. The demand continues to be mainly for Forge Irons, but there has been some in-

crease in the sales of Foundry grades, while Car-Wheel Iron has met an urgent request, with some advance obtained on specially desirable grades of Southern make. Buyers are not content, apparently, to cover contracts in hand, but are disposed to buy such amounts at present rates as will place them in an independent position, beyond the reach of eccentricities of the market. Furnaces heretofore have been ready to meet the demand at any remunerative rates, and more recently, having orders so well in hand, have gradually and slowly advanced the market, which buyers have followed with but little protest. The market continues to progress, although a few furnaces are withdrawing from the market, being either sold much ahead or anticipating higher prices, and having no cause to sell now, are declining orders for the present. The aggregate sales made here during the week are about 25,000 tons, and some heavy contracts are likely to be closed to-morrow. One local house has booked orders at the rate of 1500 daily, and another house has closed contracts for 11,800 tons, while a representative of a large Southern company has accepted orders for about 10,000 tons, but this latter is probably embraced in those of the factor's report. The bulk of these sales have been of Forge grades, but one lot of 1500 tons Southern Car-Wheel Iron sold at \$25.50, and 1500 tons No. 2 Foundry at \$15.50, cash. The following are the approximate quotations for the local market cash, f.o.b. Cincinnati:

Foundry.

Southern Coke, No. 1 (new classification).....	\$16.25 @ \$16.75
Southern Coke, No. 2 (new classification).....	15.50 @ 16.00
Southern Coke, No. 3 (new classification).....	15.25 @ 15.50
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	18.00 @ 18.50
Hanging Rock Charcoal, No. 1.....	21.00 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.....	17.50 @ 18.00

Forge.

Strong Neutral Coke.....	15.00 @ 15.25
Mottled Neutral Coke.....	14.00 @ 14.25
Gray Forge.....	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 25.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	21.00 @ 22.00

Manufactured Iron.—There has been a further increase in the volume of business in this branch during the week, but no advance in prices is recorded, although the market has hardened materially. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3¼¢ @ 4¼¢ $\frac{1}{2}$ lb.

Old Material.—There has been a moderate inquiry for both Old Rails and Wheels, and the market has ruled firm, with less disposition to sell except at full prices. Old Rails are quotable at \$23 @ \$24 and Old Wheels at \$19, cash, Cincinnati.

Nails.—The demand has been moderate and the market has ruled steady. Jobbing prices are based upon 12d @ 40d, which sell at \$1.95 $\frac{1}{2}$ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$1.95 and Steel Wire Nails at \$2.65 $\frac{1}{2}$ keg.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, November 27, 1888.

There has been nothing of an unusual character developed in the general iron trade during the past week. The mills and furnaces generally have about all they can do in working up old contracts, even if no new contracts are taken. The Iron Age, of the Gray's Iron Line, will arrive

the latter part of the week with a cargo of 1300 tons of Charcoal Pig Iron from the Cumberland River. This will be the first lot of Southern Iron of any magnitude to arrive here for several years. It was sold several months ago for future delivery.

Pig Iron.—There has been a very fair business the past week, and the market for well-known brands of Neutral Gray Forge is firmer, but prices remain unchanged. We can report sales of some 6000 tons at \$16 @ \$16.25, cash; one lot of 2000 tons at \$16.25. There is but little good Iron offering, and for this prices are steady, as quoted. In regard to Foundry Irons, there is a fair business in the aggregate, although the inquiry is chiefly for small lots, to supply immediate requirements. Bessemer Iron is slow and weaker. Within the past two weeks it has gone off from 25¢ to 50¢ $\frac{1}{2}$ ton. Round lots of good brands are now to be had at \$17.50, cash, at which price a sale of 1700 tons was reported. Small lots command 25¢ @ 50¢ $\frac{1}{2}$ ton more. Reliable advices from the Mahoning and Shenango Valleys report the furnaces out there pretty generally sold up, some of them several months ahead, and some of the furnace owners are refusing to contract for future delivery at present prices. Producers are apprehensive of higher prices for Coke, Ore and labor in the near future, and they want to keep themselves in a position to be able to take advantage of the market. In other words, if the cost of production is increased, the price of Pig Iron will have to be advanced, and furnacemen appear to be indifferent as to making additional sales, especially for future delivery. We quote as follows:

Neutral Gray Forge.....	\$16.00 @ \$16.25, cash.
All Ore Mill.....	16.75 @ 17.00, "
White and Mottled.....	15.00 @ 15.50, "
No. 1 Foundry.....	18.00 @ 18.50, "
No. 2 Foundry.....	17.00 @ 17.50, "
No. 1 Charcoal Foundry.....	23.50 @ 24.00, "
No. 2 Charcoal Foundry.....	21.50 @ 22.00, "
Mill Charcoal.....	19.00 @ 20.00, "
Bessemer Iron.....	17.50 @ 18.00, "

Muck Bar continues in scant supply and with considerable inquiry, especially for immediate delivery. Prices are firm, as quoted: \$29 @ \$29.50, cash, as to quality, in which there is considerable difference. Sale of 2000 tons reported at \$29.50. It is rumored that sales have been made for January and February at \$30, cash, but these reports lack confirmation and must be taken with allowance. So far as we can learn, there have been no sales made above \$29.50, cash, which may be regarded as the ruling quotation.

Spiegel.—Sales of Spiegel, 20 %, at \$27.50 @ \$28.50, cash. Ferromanganese, 80 %, \$56.50 @ \$57.50.

Manufactured Iron.—There is a fair degree of activity, but new business is not as plentiful as it was a few weeks ago. Prices remain unchanged, as follows: Bars, 1.75¢ @ 1.85¢; Plate, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢; all 60 days, 2 % off for cash. Demand for Skelp Iron has fallen off during the past week or so, but prices remain as last quoted, 1.85¢ @ 1.90¢; Sheared, 2.10¢ @ 2.15¢.

Nails.—Manufacturers here still refuse to sell below card rates, but, as might be expected, they are not selling any large quantities, as buyers can do much better elsewhere. In regard to the order for 10,000 kegs noted in our last report as having been placed at Wheeling, or in the Wheeling district, the broker making the deal claims that the price was more than \$1.60, net cash, but refuses to give the price. A person connected with the deal who could have no object in misrepresenting the matter reported the price at \$1.60, and there is reason to believe that the price quoted is not far from the mark.

Wrought-Iron Pipe.—There has been little change to note during the past week. Orders are falling off, as is usual at this

season, and there is not likely to be much improvement until spring. Manufacturers do not expect to do much during the winter season. Prices remain unchanged, as follows: Discounts on Black Butt-Welded Pipe, 62½ %; on Galvanized do., 52½ %; 2-inch Tubing, 13¢ $\frac{1}{2}$ foot, net; 5¼-inch Casing, 40¢ $\frac{1}{2}$ foot; Boiler Tubes, 60 % off.

Billets, &c.—There is less demand for Bessemer Billets and the market is easier. These are now quoted at \$29, cash, delivered at maker's works; Nail Slabs quoted at \$28.50; Domestic Rail Ends quoted \$19.50, cash. Sale of 2000 tons Domestic Bloom Ends, at \$19, cash.

Old Rails.—There is an improved demand and the market is firmer, but prices remain unchanged. We can report sales, in different lots, of 3500 tons American Tees, at \$25, cash. With such weather as we have had for the past day or two, the work of lifting will be very much curtailed, if not suspended, the effect of which will be to stiffen the market.

Railway Track Supplies.—Spikes are still quoted at \$2.20, 30 days. Splice Bars, 1.85¢ @ 1.90¢; Track Bolts, 2.85¢ with square and 2.95¢ with hexagon Nuts.

Merchant Steel.—There is a fair business at unchanged prices. Tool Steel, 8¼¢; $\frac{1}{2}$ lb; Crucible Spring Steel, 4¼¢; Crucible Machinery, 5¢; Open-Hearth do., 2¼¢.

Old Material.—There is a fair business, and prices as a rule are steady. Sales of No. 1 Wrought Railway Shop Scrap at \$21 $\frac{1}{2}$ net ton; Wrought Turnings, \$18.50 @ \$14; Car Axles, \$25.50 @ \$26.50; Cast Scrap, \$15.50 @ \$16 $\frac{1}{2}$ gross ton; Cast Borings, \$12 @ \$13; Old Car-Wheels, \$20. Sales of short pieces of Steel Rails at \$18.75 gross, and long length ditto at \$20.50.

New York.

Office of *The Iron Age*, 66 and 68 Duane street,
NEW YORK, November 27, 1888.

American Pig.—The market is quiet and the volume of business doing is, on the whole, disappointing. Some consumers are inquiring for 1889 delivery and some business has been done, at present prices, for next year. It is intimated that the Thomas Iron Company will certainly not ask higher prices for 1889 delivery, which would seem to put at rest for some time to come any talk of any advance in the section largely controlled by its action. We continue to quote Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is weaker. We quote: Coltness, \$21, nominally; Shotts, \$20.50 @ \$21; Langloan, \$20.75 @ \$21, and Dalmellington, \$19.75 @ \$20.

Spiegeleisen.—We quote nominally \$27 for German 20 % Spiegeleisen, and \$54 for Ferromanganese, 80 %, prompt delivery.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.44¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.5¢ @ 2.55¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢. Foreign Beams can be laid down at about 2.65¢ @ 2.75¢, but are in very light demand.

Bar Iron.—We quote: Carload lots, half extras, Common, 1.70¢ @ 1.75¢; Medium, 1.75¢ @ 1.8¢; Rolled, 1.8¢ @ 1.8¢.

Steel Rails.—The past week has been quiet so far as the Eastern mills are concerned, but has been all the more eventful in the West. It has been characterized by an extremely sharp contest for business between one mill in the Pittsburgh and one in the Chicago district, over business aggregating about 30,000 tons. A large number of contradictory rumors are afloat concerning the prices made, but there seems to be very little doubt that prices have been accepted below anything ever done in the history of the Steel Rail trade in this country. It is openly asserted that \$26 at mill has been considerably cut, and it is added that at the meeting of Steel Rail manufacturers yesterday, the fact was acknowledged by one of the contestants. Whether or not the fight is over remains to be seen. Suffice it to say that the representatives of the Steel Rail mills in the country met, talked over the situation and continued their present arrangement slightly modified. Even this is a gain, since some of the manufacturers expected the withdrawal of at least one, and possibly two mills. The meeting was held at the Windsor Hotel, being called at 11 o'clock, adjourned after several hours' session to 8 o'clock in the evening. All the leading mills were represented, the new Pittsburgh works excepted. It was finally decided to continue the August arrangement, with this change: Every mill has the right to sell any part of its allotment, or all of it, to any other mill. Until now the allotment of those works which was not taken after a certain time was redistributed among the other mills. The result was a constant pressure for new allotment by a few concerns who sold freely, which was resisted by the tardier and led to some friction. For the present the modification alluded to is not likely to create a heavy demand for the allotment of idle mills who are out of the race, simply because a number of the active sellers are engaged in the problem of getting orders for what they can sell. Nor does the temptation seem great to pay anybody else for the privilege of doing a losing business on a somewhat larger scale, since there is not a single mill in the country which can pay interest on plant when selling Rails at \$26. In the East the market is quiet at \$27 @ \$28 at mill.

Old Rails.—Outside of a lot of 2000 tons of Foreign Tees, to arrive, sold to an Eastern mill at \$23.25, ex-ship, we hear of no transactions.

Scrap.—The market is quiet. We hear of one lot of 200 tons of No. 1 having been sold, delivered to ship, at \$21, and a lot of 100 tons at \$20.50, the latter because the seller was forced to clear it away.

Rail Fastenings.—Spikes are active at \$2.20 @ \$2.25, delivered. Angle Bars have sold low in the West, one order, at Fort Worth, Tex., being placed at 2.05¢.

Financial.

While in some quarters there are heard expressions of disappointment, the general tenor of advices respecting trade and prospects for the new year is of a hopeful character. Railroad troubles, the suspension of wheat exports and derangement of the flouring industry, together with an outward movement in gold, are the principle drawbacks. Despite these facts, the accounts respecting trade and business, as gathered from representative men in New York City during the week, are generally encouraging. Dry goods jobbers report a healthy market, and the aggregate of sales for the year is believed to exceed that of the corresponding period in 1887. In the woolen industry quite a large number of mills have resumed, and the outlook for another year is promising. Credits and

collections generally are good, especially in the winter wheat States, there being fewer complaints than a year ago. The cotton crop is large; estimates vary from 6,750,000 to 7,250,000 bales, indicating a yield about equal to that of last year, valued at something like \$280,000,000, costing each bale \$40. The Produce Exchange markets are unusually dull, with wheat exports suspended by high prices, but a belief that the surplus will be required sooner or later strengthens the views of holders. Pork is 12 % higher than a year ago, and business is good. Corn exports are said to yield better returns than last year. The rice crop is short, and prices are advancing. The oil market is in the control of trusts, under conditions wholly artificial. In the leather market there is general contentment. The volume of business exceeds that of last year, the export of sole leather alone being equal to some \$5,500,000 for 1888, or say 10 % larger than in 1887. The home product of hides has increased rapidly, in consequence of the growth of the ranches, cheapening the cost of the raw material. Touching railroad interests, the fact will not escape attention that, notwithstanding the recent extraordinary pressure of traffic, the revenues of the year thus far will not equal those of the same period in 1887. The net earnings, according to the estimates of a leading authority in these matters, ought to be about \$300,000,000, the gross earnings being probably in excess of \$1,000,000,000. The big coal companies have had a remarkably prosperous season, the demands for consumption having exceeded all precedent, at remunerative prices. For the year the total output will be close upon 38,000,000 tons, or 4,000,000 tons larger than that of 1887. The meeting of Congress December 3 will be watched with some solicitude, but radical legislation is not expected.

The Stock Exchange markets were chiefly affected by trunk-line difficulties, and the general tendency of prices was lower in the absence of investors and with continued selling on foreign account. The declaration of the usual dividend, 3 % semi-annual, by the Chicago and Northwestern, had a strengthening effect; also a reported agreement among the Southwestern lines. On Saturday a heavy drop in New England was a noticeable feature. On Monday there was further weakness on reports of large specie shipments by this week's steamers. The situation in regard to railroad contentions is fairly well stated by a leading brokerage firm, as follows: "The Interstate Commerce law has driven the railroads to measures that they probably never thought of before its passage. Its prohibition of pooling will, unquestionably, compel larger combinations of our railroad systems than we have yet seen. Just how this unification of interests and centralization of power is to be brought about the railroad men themselves may not be able to predict, but the shrewdest and most far-seeing of them admit that the tendency is in the direction indicated, and, as they appreciate the necessity of greater harmony and unity of action, it is quite safe to assume that they will yield to the necessity that is more powerful than is the law." In other quarters it is probably intimated that the deliberate purpose of railroad corporations is to bring the Interstate law into discredit, thus compelling remedial action by Congress.

Government bonds were firm but not very active, the latest sales reported at the board being \$3000 coupon 4s at 128½ and \$15,500 do at 128½. Quotations are as follows:

U. S. 4½s, 1891, registered.....	107½
U. S. 4½s, 1891, coupon.....	109
U. S. 4s, 1907, registered.....	128½
U. S. 4s, 1907, coupon.....	128½
U. S. currency 6s.....	121

The weekly bank statement showed an increase of \$720,075 above legal require-

ments. This makes the surplus now held \$12,311,875, against \$6,664,400 at the corresponding time last year. The banks hold at present several millions of funds belonging to banks at other financial centers, but if the entire amount were withdrawn the banks would still be in a better position than for some years previously at this season. In loans there was a contraction of \$2,176,800. Deposits decreased \$2,410,700. The week developed a better demand for money, accompanied by somewhat higher rates. Money on call loaned at an average of about 2½ %. The fact that the beginning of a year is now at hand caused a better demand for the time loans also. Rates were 4 % for three to four months and 4½ % @ 5 % for four to six months. The recent gold movement has produced no visible effect on the local money market. The banks report less demand for currency from their correspondents in the interior than for a long time. The demand for commercial paper was active and the supply was not abundant. The exports of specie from this port during the week amounted to \$4,495,918, mostly in gold bars, making a total since January 1 of \$35,515,263, of which \$11,668,000 was silver, as compared with \$16,483,646 for the same time in 1887. Imports of specie for the week were nominal.

The market for sterling was very dull and easier. The posted rates are \$4.85 @ \$4.85½ @ 4.88½. Some of the leading bankers are inclined to believe that the special foreign demand for specie has been about filled. The urgent demand for gold from South America, where English and German capitalists have made large investments, especially in the Argentine Republic, has made it necessary to pay such rates for the precious metal that our bankers have been enabled to ship it even while exchange has ruled at figures which under other circumstances would have made the operation a losing one.

The foreign commerce of the United States for October is unexpectedly favorable in almost every particular. The total exports were \$79,903,856 and the imports \$69,549,614—balance of trade \$10,354,242, less than \$2,000,000 of which was an excess in the shipments of specie over the receipts of specie. This increase in the outflow of produce and merchandise is entirely due to the increased clearances from other ports. As the figures now stand the unfavorable balance is \$55,000,000, or about the same total as at this time last year.

The imports of merchandise at this port during the week were valued at \$8,885,797, of which \$1,819,000 represented dry goods. Since January 1 the total is \$419,919,000, against \$424,137,000 for the same time last year and \$392,499,000 in 1886.

Coal Market.

The congested state of the Anthracite Coal trade, resulting from overproduction and the close of navigation on the lakes and canals, provokes measures to check supplies from the mines, and it is understood that action to effect this purpose will be taken before the close of the present week. Three-quarters time, it is said, will be the rule throughout the mining regions. Meanwhile prices for most descriptions of Coal are weak. It is noticeable that some of the largest companies are making extraordinary preparations for an increased business in the coming year. The Reading and the Pennsylvania Railway Company alike are about to introduce the Dodge system of Coal storage at their terminals—that is, the use of tall masts, from the top of which, by means of a patent tackle, cars are moved to and fro between the mammoth coal dump and the

loaded trains. The Reading will have eight heaps at Port Richmond, each of them averaging nearly 50,000 tons. The Pennsylvania will have at South Amboy ten heaps, representing 100,000 tons. In this way an expensive water front becomes unnecessary. The system will be introduced at Chicago and other lake ports.

The Pottsville *Miners' Journal*, writing of the Schuylkill region, says: "The Reading Coal and Iron Company have expended a great deal of money this year in the improvement of their collieries and in the preparatory work needed to open new ones. Some of those that have not been in working trim for years have been or are in progress of recovery. Bear Ridge, at Mahanoy Plane, has been almost renewed, and has been working for a month, after being idle for years."

At least six other important collieries are named which are being prepared for a larger scale of operations. Prices nominally are as follows, but report says they are sometimes shaded 15¢ @ 50¢ per ton: Hard White Ash, Lump, \$4.50; Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Free-Burning, f.o.b., Broken, \$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.65; Pea, \$2.75.

Freights from shipping ports in New York harbor are quoted \$1 @ \$1.15 and discharge to Boston.

Metal Market.

Copper—Since our last week's report Copper has gone on weakening in the London market, not unlikely in anticipation of expected unfavorable statistics for England and France at the close of the present month. Thus, spot Chili Bars gave way from £78. 2/6 to £77. 17/6; ditto futures from £78. 15/ to £78. 5/; good merchantable brands from £78 to £77. 17/6; Best Selected being sustained at £82. 10/; sales, 500 tons. Our own market has been inactive and weaker with futures; November gave way from 17.50¢ to 17.35¢, and December is not worth over 17.45¢; spot, nominally 17.50¢ @ 17.62½¢.

Tin—London has been unable to uphold the advance of the previous week, and spot Straits has declined from £103 to £100. 17/6; Futures also come slightly lower, being £101. 10/; against £101. 17/6 last week. Sales 350 tons for the week. Here the sales on 'Change have been trifling at 22.40¢, spot, closing at 22.30¢ @ 22.35¢. The statistics for November are looked forward to with considerable interest, since they are likely to determine the course of prices for some time to come. **Tin Plates**—There has been very little doing, and prices are unchanged. We quote at the close, large lines, per box: Siemens-Martin Steel, Charcoal Finish, \$4.90 @ \$5.75; Coke Finish, \$4.70; Terns, \$4.10 @ \$4.25; Bessemer Cokes, \$4.25 @ \$4.35; and Wasters, \$4.15. Cokes continue unaltered at Liverpool, 13/3 @ 13/6.

Lead—The week has been an excessively dull one, sales in the open market not exceeding 300 tons at 3.60¢ @ 3.65¢ for Common Domestic, closing at 3½¢, St. Louis declining from 3.40¢ to 3.37½¢. In London Soft Spanish is also lower, coming £13. 2/6 this morning, against £13. 5/ yesterday.

Spelter—Advices from the West are anything but encouraging; the demand there has fallen off, and at the smelting works stocks are once more accumulating. Here the market has become quite flat and weak, so that Common Domestic cannot be quoted over 5½¢, while Silesian, in view of the drooping European tendency, is not worth over 5½¢.

Antimony—Is about the only metal exhibiting any life. In London Hallett remains firm at £44, and here it brings 10¼¢ @ 11¢, while Cookson commands 12¼¢ @ 13¢, the market winding up strong for both, with a first-rate demand and light stock.

New York Metal Exchange.

The following sales are reported:

FRIDAY, November 23.	
20 tons Tin, spot.....	22 40¢
100 tons Lead (on dock).....	3.62½¢
MONDAY, November 26.	
10 tons Tin, February.....	22.50¢
TUESDAY, November 27.	
25,000 lbs. Lake Copper, November.....	17 40¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, TUESDAY, Nov. 27, 1888.

The speculation in Copper has been somewhat brisker, but the fresh animation reflects reselling by operators who purchased some time ago on the belief that the "syndicate" was about to advance prices considerably, rather than a tendency to invest on the part of outsiders. In point of fact the operations have consisted almost wholly of sales by these holders and the purchase of the supply by the "syndicate" agents. The latter, it is said, are taking up the outside offerings in order to check the growing outside competition and consequent underselling, the sellers meanwhile being nowise backward about taking the small profits afforded by the transfer. Apart from the above there have been no new features. Consumers buy very conservatively.

Two new Copper producing concerns have been floated. One is styled the Calabak Company and the other the New Zealand Company. Both companies profess their ability to produce Copper at less than one-half the present market prices.

Operations in Block Tin have centered within a marrow quarter, general interest being exceedingly tame. The more conspicuous traders have succeeded in stiffening prices somewhat, however, despite the lack of outside interest.

Tin Plate makers report a more active market and some heavy booking, particularly of orders for Bessemer sorts, at prices within the extreme range ruling for a fortnight past. The increased business has imparted more tone to the general market.

On expectations of heavier demands from America there has been livelier speculative buying of Scotch, Cleveland and Hematite warrants. Prices have hardened all along the line, and there is a better tone to the market for makers' iron also.

The Waterloo works are shortly to be restarted on Phillips Pig Iron.

There has been more demand for Old Iron Rails. The inquiries disclose a moderate and concentrated supply, and also the fact that holders will not sell except at an advance on late nominal prices. There has been a full 2/6 advance since last report.

Cleveland Pig—Prices have shown no positive rise, but are firmer, and the market is more active. No. 1 Middlesboro', G.M.B., 36/; No. 3 do., 33/6 @ 33/9.

Scotch Pig—There has been a more active business, and, while fluctuating considerably, prices are decidedly firmer.

No. 1 Coltness, f.o.b. Glasgow.....	49/
No. 1 Summerlee, " ".....	48/
No. 1 Gartsherrie, " ".....	48/
No. 1 Langloan, " ".....	48/
No. 1 Carnbroe, " ".....	48/6
No. 1 Shotts, " ".....	48/
No. 1 Glengarnock, " at Leith.....	47/6
No. 1 Dalmellington, " Ardrossan.....	47/6
No. 1 Eglinton, " ".....	47/
Steamer freights, Glasgow to New York, 3/6, Liverpool to New York, 10/.	

Bessemer Pig—There is a better tone to the market and prices are firmer. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen—The market very firm and demand very active. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails—A large business still passing, but competition is sufficient to prevent prices advancing. Standard English sections quoted at £3. 18/9, and light sections £4 @ £4. 10/, f.o.b. at N. W. England shipping point.

Steel Blooms—Very little demand for these. Some sellers name slightly lower prices. We quote £3. 18/9 for 7 x 7, f.o.b. at N. W. England shipping point.

Scrap Iron—There is more doing and prices are firmer, while showing no positive changes. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Steel Billets—The demand continues fairly active and prices remain firm. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs—A fair business at steady prices. Bessemer, £4, f.o.b. at N. W. England shipping point.

Old Rails—The market is quite strong. Demand is brisker, and buyers have offered 2/6 advance. Tees quoted at £3. 6/3 @ £3. 7/6, and Double Heads £3. 10/ @ £3. 12/6, c.i.f. New York.

Crop Ends—More doing in these, and the market firmer. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate—There has been a fairly active business at reduced prices. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/ @ 15/6
IC Bessemer steel, Coke finish.....	13/6 @ 13/9
IC Siemens " " ".....	13/6 @ 13/9
IC Coke, B. V. grade.....	13/3 @ 13/6
Charcoal Terne, Dean grade.....	12/ @ 12/6

Manufactured Iron—Former prices prevail, and the market has continued fairly active. We quote, f.o.b. Liverpool:

	£	s.	d.	£	s.	d.
Staff. Ord. Marked Bars ..	8	2	6			
" Common ..	5	10	0			
Staff. Bl'k Sheet, singles.....	7	10	0			
Welsh Bars (f.o.b. Wales)...	5	0	0	5	2	6

Tin—Business has been fairly active, with only slight variation in prices. Straits quoted at £100. 17/6, spot, and £101. 12/6 @ £101. 15/ for three months' futures.

Copper—The market very quiet and prices without change of importance. Chili Bars, £78, spot, and £78. 5/ @ £78. 10/, three months' futures. Best Selected, £81. 10/.

Lead—Business slow and mainly at former prices. Soft Spanish, £13. 2/6.

Spelter—Demand has been slow, and prices are weaker. Silesian, ordinary, £17. 15/.

The Johnson Steel Street Rail Company, of Johnstown, Pa., are testing the Eureka petroleum fuel gas, the same which was tested by Oliver Bros. & Phillips, in Pittsburgh.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from November 19 to November 22, inclusive, and from January 1 to November 22, inclusive, were as follows:

	Iron and Steel.	
	Nov. 19 to Nov. 22.	Jan. 1 to Nov. 22.
	Tons.	Tons.
Iron Ore: A. Earnshaw.....	925	7,862
Pig Iron: Crocker Bros.....	400	13,757
G. T. Carter.....	275	905
G. W. Stetson & Co.....	100	14,150
James Williamson & Co.....	100	5,400
Spiegel Eisen: Crocker Bros.....	469	11,782
Gelsenheimer & Co.....	30	320
Steel: Oelrichs & Co.....	190	640
W. F. Wagner.....	41	1,388
A. Milne & Co.....	36	1,211
Chas. Huggill.....	17	287 1/4
C. A. Walschid.....	15	30
R. H. Wolf & Co.....	14	632
F. S. Pilditch.....	8	494
C. F. Boker.....	4	218 1/4
Steel Rods: Naylor & Co.....	507	18,507
Melchner, Ackerman & Co.....	40	40
Steel Billets: A. Milne & Co.....	50	1,010
Steel Sheets: Pierson & Co.....	25	1,035
Lalanc & G. Mfg. Co.....	21	505
Williams & Whitney.....	20	59
Steel Plate Cuttings: Naylor & Co.....	33	200
Steel Wire: J. A. Roebing's Sons.....	41	417
R. H. Wolf & Co.....	10	10
Terromanganese: Jas. Arkell.....	50	50
Iron: G. Lundberg.....	99	689
J. Abbott & Co.....	15	7,188 1/4
Iron Wire Rods: J. Abbott & Co.....	308	509
Charcoal Iron: Page, Newell & Co.....	50	308
Naylor & Co.....	30	761
Bacon & Co.....	25	25
Taggers Iron: T. B. Coddington & Co.....	249	249

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	4,886	522,653
Pratt Mfg. Co.....	1,787	158,449
E. S. Wheeler & Co.....	950	9,973
A. A. Thomsen & Co.....	935	142,247
R. Crooks & Co.....	897	65,813
Merchant & Co.....	783	22,559
Dickerson, Van Dusen & Co.....	727	258,541
Bruce & Cook.....	320	92,448
Consolidated F. Jar Co.....	104	1,601
H. R. DeMilt & Co.....	10	17,212

Metals.

	Pounds.	Pounds.
Tin: Phelps, Dodge & Co.....	952,980	8,637,822
Naylor & Co.....	504,959	3,551,484
Muller, Schall & Co.....	193,445	11,298,506
Bidwell & French.....	56,271	457,486
Jas. E. Pope, Jr.....	56,000	618,823
D. Thomsen & Co.....	24,753	296,610

	Casks.	Casks.
Antimony: Edw. Hill's Sons & Co.....	100	1,800
American Metal Co.....	32	317
Phelps, Dodge & Co.....	30	630

Irons and Metals Warehoused from November 19 to November 22, inclusive:

Scrap Iron: R. B. Borland.....	Tons.
	202

Hardware, Machinery, &c.

Boker, Hermann & Co., Mdee., cs., 5; Hdw., cs., 11	
Folsom Arms Co., Arms, cs., 5	
Graef Cutlery Company, Cutlery, cs., 6	
Hartley & Graham, Arms, cs., 7	
Lightbourne, T. J. & Co., Hdw., cs., 1	
Sanderson & Son, Implements, pkgs., 100	
Vom Cleff & Co., Skates, cs., 58	
Wiebusch & Hilger, Mdee., cs., 7	
Order: Hdw., cs., 6; Stoves, pkgs., 150	

Exports of Metals.

	Nov. 19 to Nov. 22.	Jan. 1 to Nov. 22.
	Pounds.	Pounds.
Copper: J. Abbott & Co.....	112,500	13,132,530
Lewisohn Bros.....		4,041,522
F. A. Lomal.....		2,581,293
American Metal Company.....		6,018,291
G. H. Nichols.....		223,959
J. Bruce Ismay.....		112,000
S. Mendel.....		500,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Company.....		224,034
J. Kennedy, Tod & Co.....		112,026
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....		449,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....		1,451,130
Williams & Terhune.....		99,320
J. Parsons & Co.....		420,000
Naylor & Co.....		448,809
Bridgeport Copper Company.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Ladenburg, Thalmann & Co.....		229,371
W. H. Crossman & Bro.....		4,000
R. Crooks & Co.....		1,000

Copper Matte: Williams & Terhune.....	464,820	37,127,749
Lewisohn Bros.....		3,021,610
American Metal Company.....	298,031	4,815,019
J. Abbott & Co.....		337,447
C. Ledoux & Co.....		939,300
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		180,965
Kunhardt & Co.....		41,652
Copper Ore: Williams & Terhune.....	192,646	1,075,196
Lead: W. Henstinet & Co.....	132,160	132,160
Joseph Gillet.....	443,200	1,586,065

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira.....	Cent.
Florin (Netherlands).....	10.2
Florin (Austria).....	35.9
Wreils (Portugal).....	51.8
Mureis (Brazil).....	61.6
Mark (Germany).....	23.8
Allogram.....	Pounds.
Picul.....	2.206
	134.

CHILL.

VALPARAISO, September 28, 1888.—Copper—Its prices are sustained in Europe in spite of the unfavorable statistics. Copper has been offered sparingly, causing prices to appreciate slightly and leading to sales of 14,342 quintals at \$29.40 @ \$30, \$29.70 equaling £77.6/2, per steamer. Nitrate.—Business was at first interfered with by the national holidays, but it subsequently revived all the more as cable advices were favorable. October-November delivery met with a strong demand, the price paid for 95% being \$2.80 @ \$2.82 1/2. As, however, suitable vessels were scarce, and available nitrate with them, transactions were somewhat restricted thereby. During the last few days the inquiry extended to later deliveries. Nothing can be had now before the end of the year, and for every month in the new year the price is \$2.82 1/2 @ \$2.85. We quote 96% at \$2.90. Total sales have amounted to 347,000 quintals at \$2.80 @ \$2.83 1/2 for 95%, and 50,000 quintals 96% at \$2.90. \$2.82 1/2 equal £8.11 1/4 @ cwt. Coal.—The arrivals are by no means large thus far; as, however, requirements have been covered for some time to come, not much transpires in the way of sales. Newcastle, per steamer bound for Iquique, is offered at 25/-. Nothing is being done in lots that sailed in August and September. These are held out of the market, consignees expecting a rise later on, since shipments this way are again on the decrease. Exchange.—Has been fluctuating between 26 1/2 d and 26 3/4 d, closing at the latter figure for 90 days' sight drafts on London.—Weber & Co.

EAST INDIES.

MANILA, November 19, 1888.—Hemp is nominal at \$11.50 @ picul, against \$10 same time last year, equaling 1/2 ton, cost and freight, £39.15/ @ £35.7/. The clearances for the United States, since last cable, have been 13,000 bales, as compared with 6000 in 1887. Since January 1 there have been shipped to the United States, altogether, 211,000 bales, against 231,000, and there are loading for the same destination 25,000, against 15,000; cleared for England, since January 1, 298,000, against 200,000 bales; loading for ditto, 12,000, against 7000; cleared for all other countries, 63,000, against 38,000. Receipts at all ports since last cable, 21,000 against 5000; since January 1, 584,000, against 477,000 in 1887 and 359,000 in 1886. Freight, \$7, against \$5.50. Exchange, six months' sight, London, 3/7 1/2, against 3/8 1/2.—Ker & Co., per cable.

COLOMBO, CEYLON, October 11, 1888.—Plumbago.—Better qualities continue scarce and in request, whereas inferior sorts are weaker. We quote at the close: Large Lumps in rupees, 1/2 ton, 145 @ 170; Ordinary Lumps, 125 @ 160; Chips, 80 @ 95, and Dust, 42 @ 65. Ebony.—Having been effected during the week. Coir Yarn.—Is in moderate request at 7 @ 12 rupees @ cwt. for Nos. 1 to 4. Shipments since October 1, of Plumbago, have been to England 1118 cwt.; to Hamburg, 300; to the United States, 2380; together, 3798, against none last year; 21,407 in 1886; and 8832 in 1885. Exchange, 6 months' sight, 1/4 31-32.—John W. Greene, 82 Broad street, New York, agent for Volkart Brothers.

JAPAN.

TOKIO, October 12, 1888.—Iron and Steel.—The import of Steel Rails has been in 1887 64,463 tons from England, against 56,950 in 1886, and 63,771 tons from Germany, against 33,945 in 1886. The import of Nails was 32,355 tons from England, against 37,409 in 1886; 35,222 from Germany, against 26,299, and 1233 from Belgium, against 23,074 in 1886. Out of the 219 foreign firms established in Tokio 123 hailed from England, 42 from Germany, 39 from the United States and 35 from France. Copper.—The French syndicate is represented in Japan

by one English and one German firm; it is through the medium of these two concerns that the said syndicate has been able to make contracts "to arrive" with some of the leading owners of Japanese Copper mines, among others with Furumava, who owns the Tachiwo mines, turning out as he does a well-known brand of fine Copper. The contract is for all the mine is capable of producing till 20,000 tons shall have been delivered. The price is \$350, in silver, 1/2 ton for the entire amount. As security, \$250,000 has been deposited with the branch establishment of the Hong Kong and Shanghai Banking Corporation in Yokohama. This puts an end to the export of Copper by Japanese firms, who prior to these contracts have been shipping Copper to China and India for their own account. For the brands of all other Copper smelting works in Japan are too unknown abroad to sell them there to advantage, and, besides, every one of them turns out so little, comparatively speaking, that it would not be worth while to try introducing them.—Japan Mail.

SPAIN.

BILBAO, November 3, 1888.—Iron Ore.—With the exception of a few single cargoes hardly anything has been done in the way of sales during the week under review. There is some demand for delivery next year, but the prices asked are different from those so far ruling on the spot. The mining companies are asking higher figures, to which the owners of iron works do not so far feel disposed to subscribe, and this is one of the reasons why the ore trade has become so languishing. The Bilbao mine owners seem to lose sight of the fact that there are desirable Iron Ores procurable elsewhere in Europe, like, for instance, in Sweden, even preferable to ours for Steel making. It is true Swedish Iron Ore exportation has not yet been started on a large scale. As yet the Swedish railway is not in running order through its entire length, but it soon will be, there being plenty of capital to carry out the enterprise. Our mine owners may dislike hearing the truth, but we do not hesitate in warning them. Meanwhile Campanil is bringing 8/ @ 8/3 1/2 ton, and Rubios 6/10 @ 7/8. Total exportation since January 1 has reached 3,129,672 tons, against 3,649,758 same time last year. Pig Iron.—During the week 1200 tons have come to be exported, and 825 have been shipped coastwise.—Bilbao Maritimo y Comercial.

RUSSIA.

ST. PETERSBURG, November 14, 1888.—Petroleum.—An imperial decree is about to be issued of a protective nature in favor of Caucasian Naphtha producers against foreign competition, thus confirming what has been hinted before, that the Emperor, after visiting Baku in person, is going to take special care of the interests of the firm of Nobel Brothers, and that the measure to be taken by the Government will be specially directed against the Rothschild Petroleum undertakings in Russia.—Journal de St. Petersbourg.

HOLLAND.

ROTTERDAM, November 14, 1888.—Tin.—Following are the October statistics of Tin:

	Banca.		
	1888.	1888.	1887.
	Sept. 30.	Oct. 31.	Oct. 31.
	Slabs.	Slabs.	Slabs.
Stock on warrants in company's hands.....	33,700	21,200	13,177
Billiton stock here and at Amsterdam.....	18,662	14,146	18,382
Total.....	51,362	35,346	31,559
Banca deliveries in October.....	9,325	11,500	15,313
Billiton deliveries in October.....	5,650	7,517	8,890
Total.....	14,975	19,017	24,143
Banca deliveries since January 1.....	101,917	113,417	122,985
Billiton deliveries since January 1.....	64,896	72,353	79,588
Banca afloat.....	8,200	4,200	.....
Banca stock in company's hands as reserve for future auctions.....	113,361	130,361	75,635
Billiton afloat.....	31,500	32,800	51,961
Prices of Banca, fl.....	63 1/2	63 1/2	71
Prices of Billiton, fl.....	62 1/2	62 1/2	70

—Koch & Vlierboom.

The United States Geological Survey estimate the total value of all minerals mined in 1887 at \$538,000,000, the greatest annual yield ever produced, and \$70,000,000 in excess of the total for the previous year. No other country in the world can make a similar exhibit.

Hardware.

With the advance of the season the volume of business is rather light, prices remaining remarkably steady with very few changes. Manufacturers are generally pursuing a conservative course and avoiding an undue accumulation of goods. There is but little complaint in regard to collections, and the general condition is regarded as satisfactory and promising.

Wire Nails.

No change has been made in quotations since our last report. The arrangement between the manufacturers of the Standard Nails is working smoothly and prices are reported as quite closely adhered to. With the understanding that exists between them, the manufacturers' prices are regarded as more settled than they have been for a long time, and it is thought not unlikely that a slight advance may be made before long. Of this, however, the manufacturers give no intimation, but it is an inference drawn by well-informed parties in the trade.

Barb Wire.

There has been little change in the New York market quotations, continuing as at our last report: 4-Point Galvanized, carloads, 3.6 cents; 3-ton lots, 3.7 cents; less than 3 tons, 3.9 cents, with delivery. The demand is quite limited.

The Washburn & Moen Mfg. Company last week obtained a preliminary injunction from Judge Blodgett, at Chicago, restraining the Joliet Barb Wire Company and H. B. Scutt, its president, individually, from infringing the Glidden patents. The bill filed charges that Scutt was licensed by the Washburn & Moen Company to manufacture a Barb Wire of a style called the Eureka. Instead of manufacturing that style, however, he manufactured under the name of Eureka a Barb Wire which was covered by the Glidden patents. He was sued both for violation of his license and also for infringement of the Glidden patents. Pending the settlement of the suit the works at Joliet have been shut down.

Cut Nails.

A slight improvement in the volume of business is reported, but prices remain unchanged at \$1.80 @ \$1.90 for carload lots, with little prospect for an early advance, in the opinion of some of the leading sellers.

A cut freight rate on Nails from Wheeling to Denver, which was made last week, threatens to precipitate a railroad war between the lines running to Colorado points. The cut was quite heavy, amounting to about 60 cents per keg.

Miscellaneous Prices.

The Gage Tool Company, Vineland, N. J., advise us that in view of the increase in their business, and consequent enlarged facilities for manufacturing their Planes, they are enabled to give the trade a somewhat better margin, and quote discount 20 and 10 per cent., instead of 20 per cent., as heretofore. They also allude to the satisfactory export demand there is for these goods, inquiries being received from South America, Australia, Mexico, England, Germany and Italy.

The Energy Mfg. Company, Philadelphia, Pa., issue a six-page circular relating to their Rope Hoisting Machines, Center Grinders, Rope Clamps and other goods, the construction of which is explained, with list prices. We are advised that these goods are handled extensively by the Hardware trade throughout the country, and in a sheet containing names of parties who have handled or used their goods we

notice the names of several well-known Hardware men and many prominent manufacturers. The discount to the trade on the Hoisting Machines is 25 per cent.

The following are the prices of the Carpet Sweepers manufactured by the Goshen Sweeper and Wringer Company, Goshen, Ind.:

	Per dozen.
Conqueror.....	\$23
Easy.....	22
Monarch.....	22
Goshen.....	21
Advance.....	18
Ladies' Friend, No. 1.....	15
Ladies' Friend, No. 2.....	16
American.....	15
Grand Republic.....	35

Ammunition is regarded as in a more satisfactory condition than it has been in for some time, the market being more regular since the action of the association, to which we referred two or three weeks ago. There is less cutting of prices, and the regular quotations are quite generally adhered to.

The Lightning Nail Puller, for which the Simmons Hardware Company, St. Louis, Mo., are sole agents, is quoted at \$21 per dozen. A description of this article is given on page 840.

Business Tendencies.

From a wholesale Hardware merchant in Texas we have received the following letter in regard to the question which has been discussed at some length in these columns as to whether the jobbers are encroaching in their trade upon the business of the manufacturers, the result of which has been to show that while the manufacturers are in general holding their own and making advances with the larger retail trade, the jobbers are filling an important place as indispensable distributors of Hardware, and by their energy and enterprise supplying a good proportion of the retail merchants, who find it to their advantage to purchase from them rather than send a large number of small orders to many manufacturers. Concerning the general question our correspondent writes:

The discussion in *The Iron Age* of the tendencies of trade being more than usually interesting I have concluded to take a hand in it. *Is the jobber losing ground in the distribution of Hardware?* This question is determined by the well-known natural law that all bodies move in the line of least resistance. The tendency of distribution of Hardware, as well as all other products, is toward the least expensive and most convenient route between producer and consumer. This is the natural tendency, and no trust or combination will ever be strong enough to effectually overcome it. The retailer complains that the jobber sells direct to the consumer. The jobber complains that the manufacturer sells direct to the retailer. The manufacturer complains that the jobber cuts prices which the former tries to maintain for the jobber's special benefit. All three seem to forget that they have a right to buy in the cheapest market and sell in the dearest market, as far as competition will permit, and most people exercise that right nowadays without regard to the inconvenience they may incidentally occasion either the jobber or manufacturer.

We may safely lay down the rule that the bulk and value of goods determine the necessity of jobbers. The greater the bulk and the lower the value the less chance there is for jobbers. Therefore, such goods as Stoves, Agricultural Implements, Barbed Wire, &c., are usually sold direct from manufacturers to retailers. Jobbers in those lines are nearly extinct. Again,

in large trade centers, such as New York and Chicago, manufacturers have agencies with stocks, which, in competition between themselves, capture the cream of retail trade, leaving no room for jobbers. Thus, line after line is taken away from the jobber by the specialist. Hence the largest distributing points do not offer the most promising future for the Hardware jobber. I am a jobber, and will say to my friends, East, West, North and South, that we still have a right to exist, which I will show. The vast majority of retailers do not reside in large distributing points. Many of them can buy bulky staples direct, but should they attempt to buy 100 articles made in 100 different factories which would average less than 40 pounds to the lot, and cost as much freight as 100 pounds, open 100 accounts on their books and buy 100 drafts for payment, they would soon learn that it is much more convenient and economical to buy their 100 articles from one house, pay one freight bill for all, run one account and buy one bill of exchange for payment. The same rule works both ways. The manufacturer can afford to pay the jobber for distributing his goods. A jobber representing 100 factories can distribute goods more economically than a manufacturer representing only one. The jobber relieves the producer of sending travelers to every cross-road of the country and running a multitude of small accounts, and making a multitude of shipments and carrying a large stock. He also relieves the retailer of carrying a large stock, keeping a multitude of little shipments on the way, running a multitude of little accounts, &c. Hence, for the present at least, the Hardware jobber is an economical necessity.

The following is from a Kentucky retailer, and gives the situation as seen from his standpoint:

We buy for cash and give the manufacturers preference, and get close prices and new goods. Jobbers are courting the small trade and even selling the blacksmiths and carpenters at same prices offered dealers. When jobbers retail goods to our trade, why should they expect us to give them orders and kick because we buy from factory?

We also take pleasure in giving place to the following contribution to the discussion, which is written from the point of view of the jobber and gives our correspondent's impression of the tendency of trade in the matter under consideration. It relates, it will be observed, especially to the Western jobbing trade:

Manufacturers of Hardware, as well as those who are engaged in making other kinds of stock merchandise, find the distribution of their product fully as important as the details of its manufacture. Some goods, it is true, are said to "sell themselves," but they are usually of novel and attractive construction or such as seem to have met and supplied a long-felt want, or they introduce simplicity and cheapness to take the place of clumsiness and high prices. There are long lists of staple articles, however, in which the goods made by one manufacturer vary but little from those made by another, or if they do vary it is in matters of detail and not of principle. In all such cases it is an important consideration how to reach consumers, and also how to reach them in the greatest numbers. It may be a comparatively easy matter to manufacture the goods, but if they cannot be sold in sufficient quantity to compensate the makers for their labor and the use of their capital, the factory will sooner or later stop its machinery and close its doors. The lesson has been learned over and over again, and sometimes at very great cost, that merely to

make an article is of no consequence if a market cannot be found or established for it. In seeking outlets for goods the Western market is by no means overlooked. The large and constantly increasing population of that section demands an enormous supply of staple goods, which are distributed among the consumers by the retailers, who in turn are supplied very largely by the wholesale merchants or jobbers, who receive their supplies directly from the manufacturers.

The jobber in the West occupies a peculiar position, which is not thoroughly comprehended by those who are only conversant with Eastern business methods. He is called upon to supply a great variety of goods to purchasers who may be scattered over an immense territory, but who desire to receive their goods promptly when ordered, requiring him to carry an immense stock, and to keep it constantly replenished. As the population of the West has increased, and railroad facilities have been enlarged, the number of jobbing centers has multiplied, but the prominent jobbers of the leading Western cities maintain their hold throughout most of their old territory and continue to thrive. The jobbers in the smaller cities are usually retail merchants who have been shown by their own experience that a profitable business could be sustained by carrying full stocks of goods, with which to supply at short notice the wants of retailers in their particular locality, among whom, however, some lines of trade will continue to be controlled by the jobbers in the large cities.

The Hardware manufacturer who establishes relations with the Western jobbers finds through them, under ordinary circumstances, a satisfactory channel for the distribution of his goods. They advertise them, put descriptions of them in their catalogues, and push the introduction or sale of them through their traveling salesmen. Much will depend, of course, upon the selling qualities of the goods themselves, but as far as possible the machinery of the jobber will be used to effectively make the desired distribution. There are many Hardware manufacturers who only use this method of disposing of their goods in the West, but there are others who in recent years have for various reasons established agencies in the principal Western cities, notably in Chicago. In a majority of cases the representation is secured through an individual or firm acting for a combination of interests which are not in conflict with one another, but there are some conspicuous instances in which a single line is thus represented. Full stocks of goods are carried by some of these Chicago branches, while others exhibit samples only and make shipments to purchasers direct from the factory. The branches selling by sample are in a manner experimental, except as to some lines of goods in which the establishment of a warehouse at Chicago would add considerably to their cost to the purchasers who would be supplied from it. Here and there a very unsatisfactory result has followed the attempt of some manufacturer to establish an agency, while there are very few that have achieved brilliant success.

The growth of these manufacturers' agencies has been assisted to a considerable extent by the efforts of enterprising young men who have had experience in connection with established Hardware houses, and who seek in this line an opportunity to build up for themselves an individual business from which they would otherwise be debarred by lack of capital, if the jobbing trade were their only hope. These manufacturing agencies, when extensive enough, maintain a force of traveling salesmen, who visit the most important towns in the West along the leading railroad lines, but there are many agents of recent appointment or limited capital who

are their own salesmen. The efforts of these branch houses are mainly directed toward securing the trade of wholesale houses, and some of them will on no account sell to retailers. They say that in this way they secure all the business they can handle, and by preserving cordial relations with the wholesale merchants they are better able to maintain prices. The number of wholesale houses through the West and Northwest is so large that their influence is very important. There are other manufacturers' agents, however, who do not confine attention to the wholesale trade, but who also invade the retail field and capture such business as they can from the best houses of that class. In doing this they directly antagonize the jobbing interest, which is particularly strong in the large Western cities, embracing firms of large capital, long standing, high credit, managed with exceptional ability, firmly intrenched in the closest and most amicable relations with the body of the retail trade, and often authorized to act as exclusive agents in their section for the largest and most influential manufacturers in the East and elsewhere. In a contest with such opponents and in such a territory the cost needs to be well considered before it is rashly undertaken.

To a superficial observer it would appear that the establishment of manufacturers' agencies in Western cities meant the introduction of an era of transition, in the course of which the jobber would be eliminated as no longer necessary in the conduct of trade. As manufacturers increase in number, as competition among them becomes more bitter, and as declining profits make it necessary to secure a larger volume of business to get as good a net return as when profits were high and margins wide, it is possible and altogether probable that efforts to reach the better houses among the retailers will increase. But it will be a long and weary struggle and a costly one, and the jobbers of the West seem destined not only to hold the volume of trade which they now enjoy but also to obtain their share of the natural increase in business which arises from the rapid growth in population of the West and Northwest, the greater necessities of the people as they become more prosperous, and the wider extension of all kinds of public improvements.

Items.

Withington & Cooley Mfg. Company, Jackson, Mich., have issued in their usual attractive style an illustrated catalogue showing their Farm and Garden Tools for the coming season. It shows their well-known line of goods, on which list prices are given, revised to date. The cover is especially attractive, being given an old-bronze finish and artistically embossed.

A. Baldwin & Co., New Orleans, La., incorporated July 1, 1888, with a paid-up capital of \$400,000, with Albert Baldwin as president, are now erecting a new store on the site formerly occupied by the City Hotel. The ground on which this building is to be erected measures 150 feet front on Camp street and 240 feet on Common street. The building will be seven stories, built of Philadelphia brick and stone. Every precaution has been taken to insure the comfort and safety of its occupants, and also the speedy and economical handling of goods. An idea of the strength of the building may be gained from the fact that the second floor is calculated to carry with safety 1000 pounds to the square foot; the third and fourth floors, 500 pounds to the square foot; the fifth floor, 400 pounds to the square foot, and the sixth and seventh floors, 350 pounds to the square foot. The store will be provided with four power elevators of the most improved pattern. The com-

pany's stock will consist of foreign and domestic Hardware, Mill, Railroad and Builders' Supplies, Agricultural Implements and Machinery. In addition to their jobbing business they are manufacturing in a separate building a number of Agricultural Implements especially adapted to the Southern trade.

The Huebel Mfg. Company, Newark, N. J., announce that they have arranged with Tower & Lyon, 95 Chambers street, New York, for the exclusive sale of their Malleable-Iron Oilers and Malleable-Iron Hand Lamps, by whom their product will hereafter be sold and invoiced.

New Process Twist Drill Company, Taunton, Mass., issue a convenient card in which they illustrate their Drills and give a table showing the different sizes of Drills that should be used when a full thread is to be tapped. This card, which is furnished with an eyelet for hanging up, will be found convenient. They also allude to the special features of their Drills, explaining that what is new in their process is the fact that the Drills are hot forged and not milled, all sizes larger than $\frac{1}{4}$ inch being thus made. Their Wire Gauge, Alphabet, Jobbers and all other sizes up to and including $\frac{1}{4}$ inch are described as made of P. S. Stubbs' Steel and are milled.

Of the Cyclists' and Sportmen's Gun and Rifle Company, 147 Washington street, Boston, Mass., Edward D. Bean is president and Samuel L. Hodgman treasurer.

The E. C. Meacham Arms Company, St. Louis, Mo., in their November price current of Guns, Ammunition, Sporting Goods, &c., represent a varied assortment of Arms and other goods in the lines indicated, together with Pocket Knives and Skates. They call special attention to their No. 1027 Breech-Loading Shot Gun, on which they are offering a special price, quoting it at \$15.

The Seneca Falls Lawn Mower Company, Seneca Falls, N. Y., have issued a descriptive catalogue and price list of the Lewis Lawn Mower, of which as a new article we gave a description a few months ago. The catalogue is neatly printed and contains a number of pictorial illustrations enforcing the merits of the machine, while cuts are also given showing the different patterns, with an explanation of its construction. The arrangement of the oil reservoirs connected with the lubricating device of the machine is specially illustrated.

The Worcester Faucet and Mfg. Company, Worcester, Mass., in their illustrated catalogue and price list explain the special features of the Worcester Faucet, with cuts showing the different patterns in which it is made. It is pointed out that this Faucet is made self-closing and non-self-closing, and in all forms is slow closing—that is, the closing of the valve is automatically retarded or extended over a sufficient length of time to gradually stop the flow, so that it will close with an easy motion and without any injurious shock or hammer. Other points in its construction are also fully explained.

Rector & Wilhelmy Company, Omaha, Neb., issue a well-printed circular in which they call attention to seasonable specialties and miscellaneous goods, of which illustrations and list prices, with discounts in cipher, for which a key is furnished, are given. It opens with Metals, which are followed by Meat Cutters, Skates, Sleigh Bells, Toy Banks, Cutlery, Plated Ware, Lanterns, Saws, Axes, &c.

The Miller Hardware Company, of Canton, Ohio, organized November 2d, 1888, have bought the stock of Paints, Artists' Materials, &c., of John H. Werner & Co.,

of Canton, Ohio; also the Hardware stock of W. A. Strayer, of Canton, Ohio. The Miller Hardware Company intend doing a wholesale and retail Hardware business. H. H. Miller, the manager of the company, is a well-known business man of Canton. The active members of the Miller Company are of the D. D. Miller Company, of Wooster, Ohio, one of the largest Hardware companies in Ohio.

D. W. Bosley & Co., 273 East Madison street, Chicago, Ill., issue circulars describing their different styles of Weather Strips and other goods. They refer to the Excelsior Weather Strip, Flexible Weather Strip, Adjustable Door Bottoms and Spring Door Bottoms. The Excelsior Weather Strips, made of wood and rubber, are familiar to the trade and are handled by jobbing houses in Boston, Philadelphia and Baltimore, and by John H. Graham & Co., of this city, who are agents for their sale. The Flexible Weather Strips are made entirely of rubber and put up in lengths of 50 feet, making a package 6 or 8 inches wide, 1000 feet making 1 foot square. They are thus given, it will be seen, a place in shelf goods.

The Protection Ventilator Company, 153 Fulton street, New York, issue a circular describing the Perfection Metal Molding and Rubber Cushion Weather Strip, which they are manufacturing. Illustrations are given of their sizes Nos. 0, 1, 2 and 3, ranging from $\frac{1}{4}$ inch to 1 inch.

Trade Topics.

From a well-known house in Melbourne we have the following, in which they refer to the value of *The Iron Age* and its advertisements, and give suggestions which may be of service to advertisers:

As regards *The Iron Age*, we go through each number with great interest and pleasure, especially in its new and more compact form, and very many of the lines we now regularly import owe their introduction to us to its columns. We find the notes as to the market prices, new goods, arrangement of stores, of considerable value to us; but it is to the advertisements that we chiefly turn in search of new lines suitable to our markets. We can hardly suppose that any suggestion we could offer has not been already thought of by you, but we should like to say that an illustrated advertisement is much more likely to attract attention than plain letter-press, and that the illustration should be changed frequently, and that if in the advertisement a note was made referring to page on which the price of the article is given, it would be a convenience. The mass of trade literature is now so large that it only gets skimmed through, and the illustration of a new line catches the eye when a mere description of the same line would be passed over.

The following letter from a Florida Hardwareman refers to hardships in connection with freights. Many of our readers will probably sympathize to a greater or less extent with the feelings of our correspondent:

Some time since I saw in *The Iron Age* a "kicker" about classification of freights on Hardware suggesting that the fraternity, manufacturers, jobbers and retailers, club together and see if there could not be a change made to our advantage. I am ready and willing to join the crowd for the following reasons: I this morning received from New York two cases of Locks that cost net per dozen there, \$1.60, and the freight charges were 30 per cent., or just 48 cents per dozen, and three cases of Loose Pin Cast Butts that cost 24 per cent. to get them from New York. Comment on this is not necessary to Hardwaremen. It is simply out of all reason. I deal in Crockery, Lamps, Woodenware, Tinware, &c.,

but at such figures as above the Hardware freights overtop the balance. A remedy is certainly needed for this practice.

The following are our advices from Louisville, Ky., under date November 24:

The Hardware trade of Louisville, Ky., for the past two weeks has been rather quiet, although satisfactory in the main for this season of the year. The extreme wet weather prevailing has seriously interfered with purchasing, especially in the retail departments, and the late, warm fall keeps winter goods from moving.

Bar and Sheet Irons are quiet; so is Barb Wire, with inclinations on the mills part to sell, but not for delivery later than December 15.

Cut Nails have been active for the past ten days. Most Wheeling mills appear to be sold up at low prices for December output. Some are entirely out of the market, and others have advanced prices. The trade looks to the mills to verify their statements that an advance will take place at the meeting next week; certainly there is room for it. The Cut Nail manufacturers would do well to imitate the action of the Wire Nail mills—viz., after loading up the trade, advance prices so as insure the jobbers a fair profit. The manufacturers can ill spare the big jobbing houses through the country; and, in a time like the present, the mills should help them by holding prices up.

The sale of Firearms and Ammunition was never before so brisk, the sporting season accounting for most of this. Shot is very low—selling for less than Bar Lead.

The other day, writes a commercial traveler, I called on an old customer, and that was all the good it did, for the weather was moist, and there were few, if any, people in town who evinced a willingness to buy anything. As it was a few moments to train time, I asked my customer, Mr. B., to go with me to the town of M., which was about ten miles up the road. He finally consented to go, and, leaving his son in charge of the store, we were soon on our way. Arriving at M., we called at the various stove and hardware stores, passing a few hours in a very pleasant manner. Mr. B. was very much interested in observing how the various stores were arranged and in observing how business was carried on. On our way back to his town he appeared to be in the best of spirits, and remarked that the trip had done him a great deal of good and that he had observed ways of doing business that would be of great service to him. We had not been in his store long after our return before he commenced to look around and notice that he was out of a number of articles that he had observed were for sale in the other stores at which we had called, and it was not long before I had received a nice order, just because he had had a chance to see something new or different from his way of doing things. It appears to me that there are many other merchants that could be "invigorated" if they would take a trip now and then to some of the neighboring towns, and call on those in a similar line of business. The interchange of ideas that would be certain to follow would be of great service to both parties. Most every person has an idea that at some time in their lives—when they become able or have time—that they will do some traveling. If this time ever does come, which is doubtful, they will find that traveling, without there is some definite object in view, soon becomes as common as staying at home. The merchant who has become accustomed to a certain amount of work every day is apt to make a poor job of retiring from business; in many cases it is not long before he "retires" from the world.

One who makes it a business to travel about the country most of the time soon learns to observe, and it does not take long before one can tell at a glance what kind of a business a person is doing, by a look at his store. When the stoves are covered with dust, and young mountains of dirt are about each stove leg, it does not look as if it was ever expected those stoves would move. It may take some talent to make a stove look as animated as

a race-horse, even when the latter is standing still; but, if it is impossible to do this, there can be no harm in trying to have the stoves and other goods look as lively as possible. Most merchants in small towns live such monotonous lives that they become more than rusty, and if it were not for the commercial missionaries, they would get so far behind the times that they could never catch up. What the average merchant requires is a little variety or change; it is not necessary that he should join a brass band or a baseball club, but there can be no harm in his taking a trip to some neighboring town now and then, and see how some other people do, and, by profiting by the (good) examples of others, it will not be many years before he has money enough to pay for a trip to Europe.

Co-Operative Buying of Hardware in England.

A good deal of interest has been awakened by the meeting recently held in London under the auspices of the Ironmongers' Association, the object of which was to consider the feasibility of forming an association or syndicate of Hardwaremen for the purpose of securing co-operation in the purchase of goods. The disposition on the part of manufacturers and wholesale houses to sell to consumers at prices approximating those given to the trade, the competition of the co-operative stores, the high prices which, under existing arrangements, retailers were in many cases obliged to pay, and the advantages expected to be secured through the consolidation of orders and the representation of a large number of houses in one buying establishment, were referred to as reasons for effecting such a syndicate. We reproduce below the substance of the address of George Bullmore, Jr., who appears to be the prime mover in the enterprise, which will be of interest to our readers as not only explaining the proposed plan, but also throwing light upon the general condition of the Hardware business in England:

Mr. Bullmore said the idea of improving the position of the retail ironmonger had occupied his mind for a number of years, and he felt strongly upon the points that would be brought before that meeting. He was aware that a scheme to a similar end had been proposed a few years ago, and that it had not been successful, but he believed that the conditions of the trade at present rendered it likely that if the matter should be again taken up success would be assured. In the first place he would remind the meeting that for some time there had been a disposition on the part of retailers to approach the manufacturers with a view to closer relationship than had previously existed. Now, he desired to state that he had no antipathy to either the merchant or the factor, nor did he intend to make a dead set against anybody. The subject under discussion was one which affected them all as individuals, and they had a perfect right to do what was best for their own benefit. He felt it necessary to make this statement, because it had got about that the proposed syndicate, association or company—whatever it might be called—is designed to make a clean sweep of the factor or merchant from off the face of the earth. He had no sympathy with such a sentiment. But what were the facts of the case? Retail traders for years had suffered from the civil service and the army and navy stores, and also from a number of so-called wholesale houses, and in his opinion it was high time that something should be done to protect their interests. The question of the competition set up by the stores he would not deal with, but he would call attention to the action of certain so-called wholesale houses. They issued to carpenters, builders, and others circulars quoting prices for various tools, which would be supplied at certain rates provided £1 worth were taken at one time, and cash paid with the order or on delivery. These lists are kept by the recipients, so that when anything is wanted instead of going to the ironmonger's shop they send direct to the wholesale house. Now, it may be said that the retailer should do the same thing, but to do that means time and money, and either one or both of these essentials cannot always be afforded. Then, not content with dealing direct with users of tools, they had also done business with drapers upon a basis which enabled the draper to offer various articles at a very low rate, against which the retailers could not afford to compete under existing circumstances. It was,

however, necessary to meet that competition, and the question naturally arose how to do it. To his mind the only way was through combination, and he proposed as a basis for discussion that a syndicate should be formed to which a certain capital should be subscribed, and that if the undertaking should be successful a fair interest should be paid to the shareholders, and the balance of the profit be distributed among the purchasers by way of a bonus, according to the business done during the year, because he was strongly of opinion that the arrangement should be established on a mutual basis. As there would be but one house to deal with there would be no necessity to employ travelers, and travelers' expenses, as they all knew, were a heavy item in the accounts of either a manufacturer or a factor. Another point he believed that would commend itself is that they would be able to buy goods and find them to be what they were assumed to be. He knew from experience that in buying from certain houses in certain provincial centers he had found things to be of German make that he believed were of English make. He did not wish to decry all German goods, but if they were sold by the syndicate they would be sold as German, and English goods would have a fair chance. Thus the syndicate would be a guarantee of quality. There were several other features to which he might refer if needful, but he hoped that the advantages which were likely to accrue from the establishment of the syndicate would be sufficient to show that the idea was practicable. He thought it would be admitted that a factor's business is almost of necessity a credit business, and that, therefore, those who buy for cash get little or no benefit from paying on delivery. If the syndicate was formed the cash buyer would get the advantage of his cash dealings, and would not be called upon, as is now the case, to help to pay for the bad debts that are made by factors. Now, having hinted at some of the advantages he desired to refer for a moment to some of the difficulties which opponents of the scheme say will be met with. First, it is declared that the intricacies of buying would be a formidable obstacle in the way of success, but he did not think that that objection was very important. It was well known that private firms were more or less dependent upon their buyers, and he did not see that it would be more difficult for the syndicate to secure the services of good buyers than it was for private firms. A second objection was that it would be impossible to successfully carry out the proposed undertaking without having depots in several large centers in which heavy stocks would have to be carried. For his part, he hoped that the business of the syndicate, if established, would soon involve that necessity, but at the outset it would be sufficient to have one warehouse, say, in London. As to the large stocks, he apprehended that, seeing the purchasers would be spread over a variety of districts, no great loss or inconvenience would be experienced in keeping stocks, because there would be a more or less steady demand for all classes of goods. It was next objected that if the syndicate was formed there would be an end to the privacy of contracts, because A would know what B was doing. This, he thought, was a very weak argument, especially when traders are willing to let directors of a Joint Stock Bank know how their accounts stood. But there would be no reason why A should become acquainted with the transactions of B, for save the directors and auditors no one need know anything about individual accounts. Again, it was objected that the syndicate would be unable to send out travelers. Now, as already remarked, there would be no necessity to send them out. These objections he did not think were important, but there would be difficulties to contend with. It might be taken for granted that some of the trade papers will oppose, and preparation must be made to meet the inevitable in that respect. To meet that opposition they must be strong at the outset, and he did not see that they could take a strong position unless the retail ironmongers take a greater interest in what so immediately concerns them. He knew from experience how difficult it was to get the ironmongers to move, how hard it is to even get a reply to a letter on this or any kindred subject. He felt confident, however, that if we can induce the friends to move in this matter, they ought not to anticipate any less success than that which has attended the Grocers' Association. He said that that association has been successful, notwithstanding the statements made to the contrary, because he held in his hand their balance-sheets, which show not only a good profit, but also a low rate of working expenses. They may not, perhaps, be able to work their syndicate on quite so low a basis; but even assuming it to be double that of the Grocers' Association, they would be successful. He concluded by moving the following resolution: "That this meeting considers that a scheme of co-operative purchasing will be to the advantage of the trade."

In the discussion which followed a number of well-known ironmongers participated, and we give below some of the points which were brought out:

Mr. Grant had a strong belief that retailers, and especially small men, ought to buy cheaper than they did at present, and he believed he was well within the mark when he stated that large buyers bought fully 10 per cent. cheaper than small men. Mr. Portway: If the present proposal was toward the establishment of a general factoring business, then he thought it would be a great mistake. Between the grocery and the ironmongery trades there was no parallel. The former comprised about 20 separate articles, but the latter included 10,000 articles, and it would, he feared, be a most difficult thing to compass the whole of them in one business.

Mr. Weeks, Jr., had some figures which he thought would throw a light upon the system of buying from factors. Certain articles had been purchased from a middleman, the cost of which amounted to £7. 10/. To ascertain what they would cost if purchased from the manufacturer, he put himself in communication with the maker, and found the sum would be £2. 8/6. In another instance a factor charged £5, against the manufacturer's price of £2. 12/6, while in other instances articles obtained through factors were 3/4, 3/8, and 4/, respectively, the maker's prices being 11d., 1/, and 1/2; and still in another case, a set which through the factors cost 2/ could be purchased elsewhere at 11d.

Mr. Tregellis was afraid that to establish a syndicate like that proposed would involve a capital which the present state of the trade would not admit of. He had a strong belief in individuality, and that it would be an unwise thing to curtail it, or even to put such a check upon competition as would tend to reduce the advantages which necessarily pertain to a man of capital and a cash buyer over a buyer who took six months' or even longer credit, and then gave a three or four months' bill.

Mr. Luckin, secretary to the association, remarked that some two or three years ago he found that in various districts ironmongers were co-operating in order to make various purchases. These ironmongers were not of necessity in competition with each other, as perhaps two or three of them might be located in one town and the others in neighboring towns. If the principle of competition was got rid of, he thought it would not matter whether the small buyers were placed on the same basis as the larger buyers. Mr. Cottis complained of not so much the difficulty of buying cheaply, but of getting good quality. He was sorry to have to say it, but he could get goods from America quicker than he could get them from a provincial center. That showed tact on the part of the Americans, and it would be highly advantageous if our English makers would copy the Americans in that respect. There was one other point to which he would refer—viz., assuming the syndicate kept an all-round general stock, he thought it would be an expensive matter to handle and rehandle heavy goods.

The resolution was then put to vote and unanimously carried, when a committee was appointed to propound a scheme which would be submitted to a future meeting. The report of this committee will be awaited with interest.

Commenting on this proposal and the discussion concerning it, the *London Ironmonger* says editorially: •

Some of the speakers made statements respecting the prices charged by factors which were either very far-fetched or revealed remarkable incompetence in buying on the part of many ironmongers. Factors, no doubt, do put on considerable profits here and there, but we think we are correct in stating that there is sufficient competition among the factors themselves to prevent the imposition of anything like the 100 or 150 per cent. profits alluded to at the meeting. In a general way, indeed, there is no room for doubting that factors do their business at 10 to 15 per cent. profit, and it is equally certain that with the very small accounts some of them have their trouble is well worth the rate of profit they get. In saying this we do not sacrifice our fixed idea, that it is better to do business direct with the manufacturers rather than through factors, but as we have no wish to be other than just and straightforward to all concerned, we recognize the fact that in many of the minor departments of the trade the factors have been, are, and probably will be, useful and convenient distributors. If ironmongers submit to exorbitant charges on the part of the factors, then the ironmongers are greatly to blame. They ought to know their own business much better than to pay such charges, and there is no excuse whatever for their not doing

so, seeing that the advertising pages of the *Ironmonger* are at their disposal at all times. The difference between buying well and buying badly is the measure of the success or failure of any business.

Amid the keen competition now existing there is hardly any excuse for an ironmonger who does not buy as well as the sizes of his orders allow him to do. If by co-operating with each other in the purchase of leading lines of goods ironmongers can do better, it is clear that they will be very foolish not to do so. But when they have done that there will be much more to be done. Many of them are content to proceed in old-fashioned ways, and show little or no disposition to move with the times. Many of them still adhere to the worn-out long-credit system both in selling and buying, and then expect to be able to compete with the man who works on a cash basis throughout, and so gets every possible advantage. Many of them have their shops full of old and unsaleable stock, and do not recognize the stern necessity for constantly changing and replacing the goods they offer to the public. Co-operative buying alone will not remedy these faults any more than it will enable ironmongers to meet the competition of such manufacturers as sell direct to the public, or that of the co-operative stores. Briefly, the ironmonger needs to "look all round," and to adapt himself to the changed and ever changing requirements of the times. He cannot afford to sit still, for if he does he is ruined. He must try well and sell well in order to keep abreast of his numerous and energetic rivals. He can do both by going about the business with combined intelligence and industry.

How to Collect.

A correspondent writes as follows: While it may take an artist to sell goods, the person who does the collecting should have a cheek that was made in a brass foundry. When a person buys anything he has to undergo a sort of inner struggle to make up his mind that the article in question is what he wants and something he cannot get along without. After this struggle is over, and the article has been charged, it is as hard to get him to pay as it is to do anything with plaster of paris after it has once set. The writer of the following rules must have been a bright and shining light in the collecting business. Particular attention is called to No. 12.

1. Never give the idea that you call because you happened to be in the neighborhood.
2. Never plead that you are in absolute need of the money.
3. Never explain why you want the money further than by some general phrase, as to meet outstanding bills. The debtor is usually an expert in showing a man how he can get along without money. He will worst you in argument, and if you lose your temper it is an excuse for him why he should not pay.
4. Always be civil, however business-like and importunate you may deem it necessary to be.
5. Never think you have done wrong because a debtor gets angry. His anger under civil treatment shows that he does not intend to pay. This you might as well know early as late.
6. Show quite as firm a resolution to get the money on your tenth call as on any previous one, or else it would have been better if you had not made it.
7. Never leave a debtor without his setting a time when he thinks he can pay, and never fail to be on hand at the time set.
8. As between yourself and an employee, let the most business-like of the two make the dun.
9. Suggest installments. Shame the debtor into an arrangement to pay something every week or month. If not \$10, then \$5, or \$3, or \$1. It will convince him that you have set to work in earnest to get the money.
10. If a debtor get angry, or has worn out your patience, a threat to attach his salary may be effective, not so much that he is likely to fear that you will get the money that way, as that he will be anxious that the affair shall not come to the knowledge of his employer.
11. A similar effect may be produced by saying you intend to place the bill in the hands of a lawyer, particularly if you mention a lawyer whom he hates or who has a reputation for harassing debtors. Professional debtors, however, become careless about legal processes.
12. Drop into a debtor's favorite haunts. It will make him uneasy, especially if you do not hesitate to ask him politely, but plumply, for your money on occasion. This may often happen after he has displayed a roll of bills.

Arrangement of Stores.

H. G. Hall & Son, 155 Beach street, Boston, Mass., send us some suggestions in regard to Hardware-store arrangement, which are represented in the accompanying cuts, Figs. 302 and 303, and also an explanation of their method of making price cards, as indicated in Figs. 304 and 305.

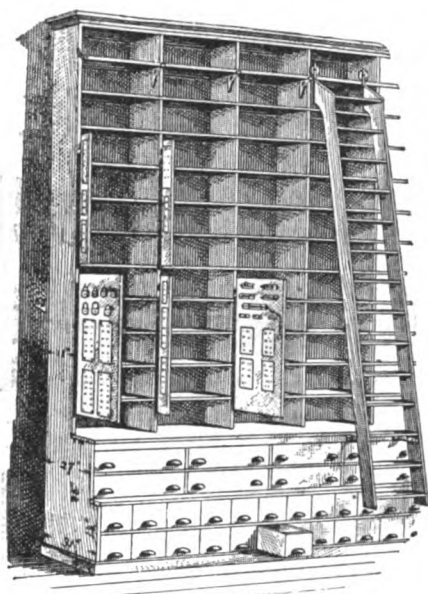


Fig. 302.—Shelving, Price Cards, &c.

Fig. 302 represents shelving with movable ladder and price and sample cards. The projection, 18 inches from the floor in the counter or base on which the shelving rests, will be observed. It is intended to be used as a step, which will be of service in taking goods from the shelves at such points that the ladder is not required. The regular working stock is kept in the shelving, while surplus goods are accommodated on the broad shelf above. Fig. 303 represents

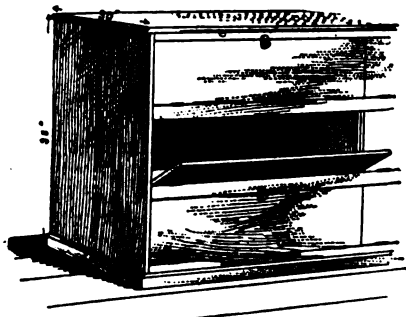


Fig. 303.—Counter for Heavy Goods.

sents a counter for heavy goods. It is the same on both sides, and contains bins which are closed by doors, as indicated, in which the goods can be kept out of the dust. In Figs. 304 and 305 other price cards for Bolts and Thumb Latches are reproduced, and indicate in a general way their method of having ready access to the matter contained thereon. It may be suggestive to our readers, and we shall be gratified if their publication calls out other information in regard to methods adopted for the same purpose.

Contracts Made by Traveling Salesman.

One of the many points of law with which every dealer should be more or less familiar is that relating to contracts made by traveling salesmen, and to what extent the dealer may look for redress in case the contract is violated by the house repre-

sented by the salesman. It may be interesting to lay before our readers a few facts bearing upon this point, which show the law as laid down in the New England States. The article here given is contributed by a writer in the *Grocers and Cannermen's Gazette*, published in Boston:

The contracts made by a traveling salesman in the line of his business are binding upon his principal, though the salesman exceeds his authority. Where he agrees with his customer, in order to secure the trade, as to the mode and time of payment, and forwards his order to the house and the goods are shipped, the agreement is binding upon the principal, unless it can be shown that the customer signed the order, or knew its contents and assented thereto, and the order itself was silent upon the special agreement. The courts in considering cases involving questions of this kind have drawn very fine distinctions, until now it is a short step across the dividing line which separates the valid from the void contracts of agents. These dis-

THUMB LATCHES.									
SELL	RETAIN					Calcp	Page	Key	Cost.
35 6	- 10	1072	Cor	J&P	139	003.	112	55-10	
62 8	- 10	1073	Cor				125		
		25	1150	Cor	Barn Door	140	003	55-10	
		30	1138	Cor	Jap. Door	141	003	60-10	
		30	1185	Cor	Brzd Door	144	003	60-10	

Fig. 304.—Thumb-Latch Price Card.

tinctions, however, when examined, will be found to rest upon sound reason and good sense, and they should be fixed in the minds of all who have occasion to employ or deal with agents.

The two marked cases in New England, showing the most advanced positions of the courts, upon either side of the dividing line, are *Clough vs. Whitcomb*, decided by the Supreme Judicial Court of Massachusetts in 1870, and *Billings, Taylor & Co. vs. Mason*, decided by the Supreme Judicial Court of Maine, in August, 1888.

BOLTS									
Light Wt. Barl. Bolts.									
365 P 78	Sarg	Dis	60-10-10						
List Dos	150	190							
Sell Carp									
Retail	13	15							
Wt. Barl. Bolts									
367 P 78	Sarg	Dis	60-10-10						
List Dos	215	245	300						
Sell Carp									
Retail	18	20	25						
Wt Square Bolts									
305 Strap	P 90	Sarg	Dis	60-10					
307 Square									
List Dos	250	265	285	375	400				
Sell Carp									
Retail	20								

Fig. 305.—Price Card for Bolts.

In the former case, Judge Wells, speaking for the full court, said:

It appears by these exceptions that the goods in question were delivered to the defendant by the plaintiff, directly, and not through Clark, the alleged agent. They were so delivered upon written orders, signed by the defendant, addressed to the plaintiff, and giving the description, quantity and prices of the goods desired.

These orders were solicited and forwarded by Clark, who was the plaintiff's agent for that purpose, and was to have a commission upon sales so made. Whether he was authorized to make contracts of sale and to receive payment, or to make agreements as to the mode of payment, was in dispute upon the conflicting testimony of the parties. Unless he had such authority, or was held out by the plaintiff as having such authority, his receipt of or agreement to receive in payment other goods, by way of barter, would not bind the plaintiff, and he may recover for the goods in this action. Upon the face of the orders upon which the goods were delivered, the price is payable in money to the plaintiff.

In the latter case Judge Danforth, speaking for the court, said:

The action is assumpsit upon an account annexed. The defendant admits that he received from the plaintiff the goods charged and makes no question as to the prices. This makes a *prima facie* case against him; and though technically it does not change the burden of proof, it devolves upon him, if he would avoid this responsibility, to give some reason why. The explanation offered by the defendant is that, though he received the goods from the plaintiff, he received them by virtue of an express agreement with an agent or traveling salesman of the plaintiff, one element of which was that certain goods of a like kind, which the defendant then had, should be taken in payment. This agreement with the agent is not questioned, but the answer to it is twofold: (1) that the agent has no authority to make such a contract; and (2) that the contract under which the action is sought to be maintained was made directly with the plaintiff, though in some degree through the instrumentality of the agent.

Assuming, under the first, that the agent had no authority to make the contract he did—and the evidence is quite conclusive upon that point—still it does not change the conceded fact that he not only assumed the authority to do so, but did actually make such a contract. Waiving for the moment the second point raised, this was the only contract having the assent of the defendant, the contract under which he acted and by virtue of which he obtained the goods. It is quite clear that the plaintiff cannot hold him upon a contract he did not make, or repudiate the contract in part and hold the remainder valid.

The second point relied upon by the plaintiff must fall with the first. True, the order for the goods was sent to the principal, presumably by the agent, with the consent of the defendant. But as to the nature of the order received there is a singular absence of testimony, though we have the evidence of the plaintiff's business managers. Whether it was accompanied with a statement of the contract does not appear. It is certain the agent had no authority to send any other, and by no other would the defendant be bound. He had a right to suppose that the plaintiff's own agent would send the order correctly, and that, when he received the goods, they were sent according to the contract. If such were the case, the contract of the agent would be affirmed by the principal in sending the goods. If such were the case, the defendant would certainly be no more bound than the plaintiff who first gave credit to the agent.

We are indebted to Mr. P. Barnes, of Pittsburgh, for a very interesting photograph of a Bessemer converter at the American Iron and Steel Works of Jones & Laughlins, Limited, Pittsburgh. This photograph was taken by the light of the converter. It is very clear and sharp, and vividly reproduces the brilliant scene with which all are familiar who have visited a Bessemer plant at night.

A Duluth dispatch says a syndicate of Pennsylvania railroad capitalists, with a capital of \$6,000,000, has been formed to operate a line of steel boats to run between Duluth and Erie ports. The vessels will be 324 feet long, and will carry 3500 tons cargo. It is supposed that this action is taken to prevent the diversion of traffic caused by existing arrangements between the New York Central and Manitoba Railroad and the Northern Steamship Company. The vessels will be ready for service in the spring of 1890, will be built on the Delaware River, after the Clyde models, and a speed of over 17 miles per hour is guaranteed. The arrangements are said to comprise a large terminal plant in Jersey City.

Enamel Drive-Well Points.

An improvement in well points recently patented, and which is illustrated in the accompanying cuts, is of importance to all of our readers who have anything to do with drive wells. The points are rendered practically rust-proof by being finished in agate enamel; the same article as is used on an important line of kitchen utensils which many of our readers handle. The enamel is so applied as to secure the in-

the cut. The top of the burner is, it will be observed, so constructed as to give a flat surface of sufficient extent to hold the utensil to which the heat is applied. The point is made by the manufacturers that the wire gauze acts as a ventilator to the stove, allowing of no downward draft, so that there will be no flame beneath the gauze, the match being applied and all the flame being above it. The burner is referred to as giving a powerful heat and doing its work efficiently, while at the



Fig. 1.—Agate Enamel Well Point for No. 2 Pump.

closed metal against rust, and accordingly there is no danger of the inlet being choked. According to the circular before us points of this style are estimated to last in cold, wet earth for one or more generations. Among the features in the point, aside from the application of agate enamel, is the space devoted to the gauze strainer. This, we are informed, is greatly in excess in area over that of any other make, and is held apart from the tube sufficiently to let the water filter through its length and width, save only at the soldered margins which are indicated in the engravings. Referring to the engravings, Fig. 2 shows a 30-inch tube with perforations. It is first wound spirally with brass cord, and next wrapped with wire gauze, both being

same time it is neat in appearance and comparatively inexpensive.

Combined Stove-Pipe Thimble and Ventilator.

What is known as Ekstrom's Combined Stove-Pipe Thimble and Ventilator is being introduced by Cheney & Hewlett, 201 Broadway, New York. It is for the purpose of utilizing one flue for both smoke and ventilation purposes. How this is accomplished, is revealed in Figs. 1 to 3, inclusive, of the accompanying illustrations. The stove-pipe passes into the flue in the usual manner. The thimble is cast as a part of the ventilator, and is provided



Fig. 2.—Sectional View Showing Construction of Agate Enamel Well Point.

secured. Outside of all this is the perforated brass plate usual to articles of its class. Fig. 1 represents a 20-inch point suitable for a No. 2 pump. This improvement is the invention of Dr. W. A. Royce, of Newburgh, N. Y. The goods are sold, among others, by the Edward Barr Company, 78 John street, New York, and the Wells Rustless Iron Company, 21 Cliff street, New York. J. Addison Brown, of Riverhead, N. Y., is the local agent for the goods at that place. A letter received from the latter gentleman speaks in enthusiastic terms with reference to the utility and advantages of this improvement.

Gas Burner Stove.

This article is manufactured by Silver & Co., 56 Warren street, New York. It is described as readily attached to any



Gas Burner Stove.

ordinary gas burner, no screwing being required for fixing it in place, the stove being simply put on the burner. It is made with wire gauze, which extends across the top of the cup below the word "Vim" on the iron frame, as shown in

with means for holding the stove-pipe in place. Close inspection of Fig. 1 will reveal two thumb-nuts above the thimble. These are used to tighten a wire loop that extends down under the stove-pipe, and thus holds it in place. Above the stove-

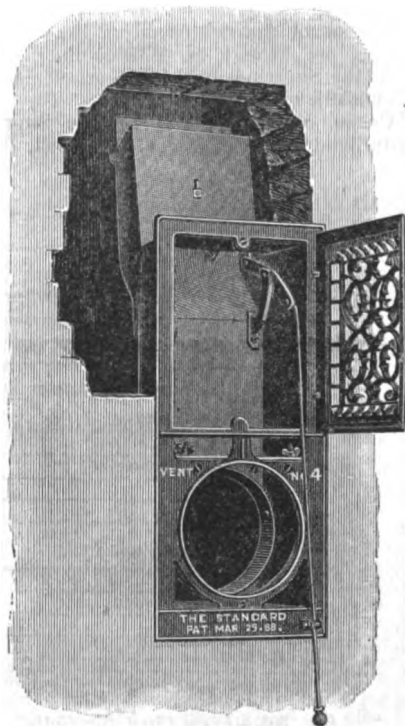


Fig. 1.—Combined Stove-Pipe Thimble and Ventilator.

pipe a ventilator is provided, constructed register fashion, the register being in the form of a door, shown open in Fig. 1. This communicates with a pipe-shaped

part, which extends upward into the flue, and which carries the vitiated air from the room into the chimney flue, discharging it at a point so far above the smoke as to make it impossible for the smoke to return, while at the same time it gives the ascending column a certain degree of impetus.



Fig. 2.—Base or Ceiling Ventilator.

At the upper end of the ventilating duct is a valve which is operated by a bell-crank rod and handle, clearly shown in the figure. By this means it is possible to shut the ventilating draft entirely, when desired, and also avoid the annoyance of dirt com-

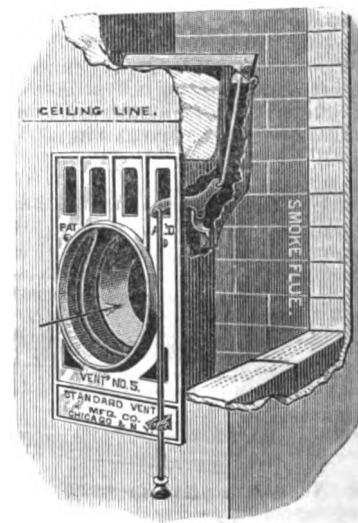


Fig. 3.—Kitchen Range Thimble and Ventilator.

ing into the room when anything is being done in the chimney, as, for example, cleaning the flue. Figs. 2 and 3 show modifications of the same general idea. Fig. 2 represents a base or ceiling ventilator constructed upon the same plan, omitting the thimble. This article is adapted for use in buildings where ventilators would be employed, but rendering it possible to utilize the one flue for the double purpose. It may be placed either at the base or ceiling, as desired. Fig. 3 shows the form of the article that is manufactured for kitchen ranges. In this the ventilating part is reduced to openings around the thimble, but, in other respects, the article is essentially the same. The general utility of this device will commend itself to our readers.

Magic Vegetable Parer, Corer, Slicer and Scraper.

The New York Glass Enameling Company, 88 and 90 Chambers street, New York, proprietors of a special method of coloring glass, are about putting on the market a specialty called the Magic vegetable parer, corer, slicer and scraper, which is illustrated herewith. William Cunningham, one of the company, is giv-

plumbers' apprentices. A special instructor will hold classes two evenings in each week for three months. The tuition fee for the season is \$3.

Gwinner's Patent Common Sense Caster.

We illustrate herewith a new caster which is being manufactured and placed on the market by Gwinner, Dowrey & Co.,

upright stem, which plays in a socket back of the axle, thereby preventing a direct thrust downward which would bind the stem and cause it to rotate with difficulty. The extent of oscillation is shown in that part of the caster exhibited in the



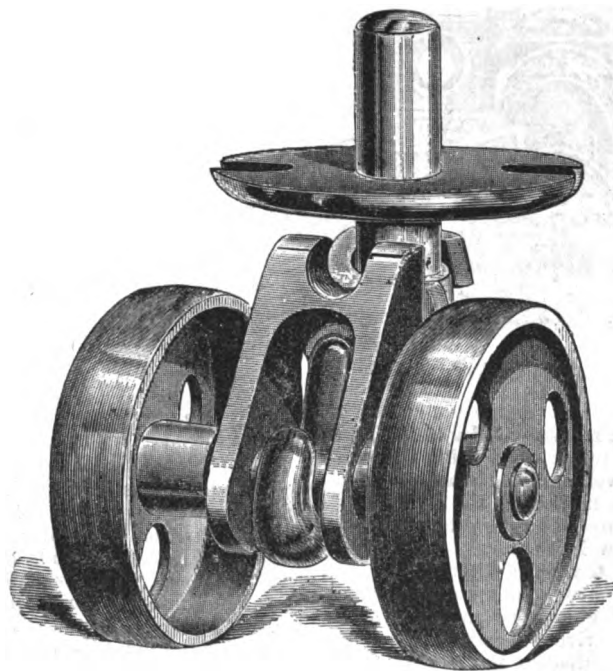
ing his attention to putting it on the market through the hardware trade. The special features of this simple implement are shown in the cut, from which it will be seen that it consists of one piece of steel of the form indicated, the ends being bent in opposite directions, so as to give the requisite construction for the purposes for which it is intended. The knives marked A and C are intended for slicing and paring and are adapted for use in either right or left hand. The use of the different parts for scaling fish, scraping vegetables, cutting fruits and vegetables, coring or eyeing fruits and vegetables will readily be inferred. The cut represents it full size. The efficiency with which it does its work, its adaptation to different uses, the ease with which it is kept clean and the very moderate price at which it can be sold are points that are specially mentioned in regard to it.

The Denver Castings Contract.

We are informed by Horace A. Keefer, of Kansas City, Mo., that the contract for castings for the Denver cable railway has been awarded by him to Shoop & Baughman, of the Centropolis Car Works, who are just erecting a large plant at Kansas City. They will commence work by December 15. This is the contract which at one time seemed destined to go to England. Mr. Keefer writes us that the chief reason for not placing the contract in England was because the engineer of the railway, Robert Gillham, did not feel satisfied to have the castings come from there, fearing delay in delivery, and also because he objected to having them inspected abroad. At present Mr. Keefer does not feel at liberty to make any further particulars public regarding this transaction, or the price at which the yokes are to be furnished.

A plumbers' trade school was opened in Philadelphia last week, under the auspices of the Master Plumbers' Association of that city, exclusively for the benefit of

of Hamilton, Ohio. The Reading Hardware Company, 73 Wabash avenue, Chicago, are agents for the sale of this caster west of Buffalo. As will be seen from the cut, this is a two-wheeled caster. It is intended for use on all kinds of furniture,



Gwinner's Patent Common-Sense Caster.

from the smallest center table to the heaviest book cases, &c. Only two screws are required to hold it in place. The caster above the axle consists of three pieces, which are held together without screws or washers, but are so loose as to be capable of rotating and oscillating as the furniture is moved over uneven floors, on extra thicknesses of carpet, &c. The weight of the furniture is thrown on the

more than one-third of its length, and is attached to the frame by a hinged joint, which permits quick operation, as it is not necessary to screw or unscrew the rod the entire length. The facility with which it can be cleaned is also referred to.

Thirty-six deaths have occurred since April 1 among Produce Exchange members who belonged to the gratuity fund.



Beef-Tea Press.

cut. The play allowed in the housing or frame would permit one of the wheels in a No. 7 caster to pass over an obstruction about $\frac{1}{4}$ inch high without difficulty. Seven sizes are made, No. 7 being the largest. The plates are made with long or short stems, the long stem plate requiring no screws to attach it to the furniture. This caster, of all sizes to No. 7, is made with either iron or lignum-vitæ wheels.

The Family Beef Tea Press

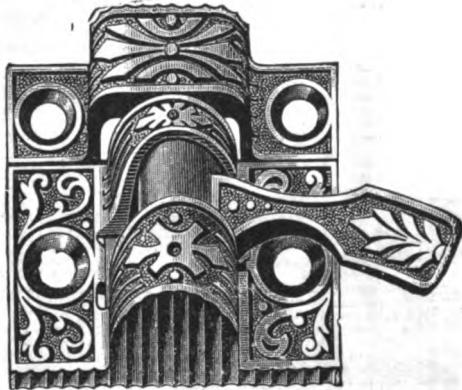
This article is put on the market by Silver & Co., 56 Warren street, New York, and embodies, it will be observed, some new features. The point is specially made in regard to it that it is quick in operation, and offered at a low price. It is intended for use for beef tea, meat, jelly, lard, &c. The cup holds a pint. It will be observed that the screw is threaded a little

Noiseless Lightning Sausage-Cutting Machine.

Peter Wilkes, Trenton, N. J., is putting on the market the Noiseless Sausage-Cutting Machine, the construction of which is illustrated in his circular, with a reference to the special features of the machine. Among these are that it is noiseless; that it does not grind or crush, but cuts the meat; that it is neat and compact, taking up little room, and has few parts; that the cover being hinged, the operator is afforded an opportunity to thoroughly clean the bowl and knives without danger of getting cut; that the knives are guaranteed to cut within the thickness of writing paper and not strike the iron; that they are easily taken out and sharpened and as easily adjusted, and that the machine is carefully constructed by skilled workmen and of the best materials. Other details in the construction of the machine are also mentioned and referred to as, with those given above, justifying the confidence of the manufacturer, who is also the patentee, in placing this machine on the market. The machine is made in two sizes. The smaller is described as cutting 50 pounds of pork sausage in two minutes or 50 pounds of beef bologna in three minutes. The larger size has double this capacity.

North's Sash Fastener.

This article is manufactured by North Bros. Mfg. Company, Philadelphia, Pa., under patents August 7, 1887, and March 18, 1888. The appearance of Nos. 40, 41, 60 and 61 is shown in the accompanying illustration, from which it may be inferred its construction is especially simple. It will be seen that the bolt is operated by a lever of sufficient length to be powerful in its action and rendering it easy to draw the sashes firmly into position. The end of the bolt which en-



North's Sash Fastener.

gages with the keeper on the upper sash is made of such a form as to cause it to take hold when the upper sash is slightly below its proper level and to simultaneously raise and draw it close to the other sash, where it is firmly held when the lever is down, as shown in the cut. The manufacturers call attention to the fact that the fastener is very strong and practically unbreakable at the locking point; that it contains neither rivets nor screws to work loose or break; that no part of it projects from the front of the sash to interfere with blinds and screens; that it is easily attached; that it presents a neat appearance, contrasting in this respect favorably with other sash fasteners on the market; and that it has received the approval of architects and builders. It is made in a variety of patterns, of iron and solid bronze.

The Secretary of the Treasury decides that appraisers of imported merchandise must be citizens of the United States,

which ruling will make a change in the practice prevailing at the port of New York.

New Nail Pullers.

The Kansas City Foundry and Machine Company, 606 Wyandotte street, Kansas City, Mo., own the patents and are the



Fig. 1.—The Lightning Nail Puller.

sole manufacturers of the Lightning nail puller and the Noiseless nail puller, illustrated in the accompanying cuts. The Lightning nail puller, for which the Simons Hardware Company, of St. Louis,



Fig. 2.—The Noiseless Nail Puller.

are sole agents, has a malleable iron socket and lever, with jaws made of Jessop's steel. A broken jaw can be replaced at slight cost. It will cut iron bands on boxes or bales, will pull headless nails, and will draw nails from $\frac{1}{4}$ inch below the surface. It is so constructed that driving the jaws into the wood does not cause them to close, hence, a nail below the surface may be gripped as easily as one not driven in below the top of the wood. The Noiseless nail puller is handled by the manufacturers themselves. Its construction is plainly shown in the illustration.

I. V. Williamson, the aged Philadelphia millionaire and philanthropist, has just rounded up a career of usefulness by devoting \$12,000,000 to the founding of a great industrial school for boys, to be known as the Williamson Free School of

Mechanical Trades. The institution will be devoted to the education of white boys, irrespective of race or religion, in the old-fashioned trades. When completed and in operation the school will be endowed with a fund of many millions, the exact sum not known, even to the founder himself, at present.

A New Coke Association.

The recently organized Coke Producers Association held a meeting at the Yough House, Connellsville, Pa., on Thursday, the 22d inst. There was a very fair attendance, a number of firms being represented by proxy. It was decided to lease 1000 cars at once and put them into the trade. The price of coke also came up for discussion, and it was decided to make no change for the present. From present indications an advance of 25 cents per ton will probably be made within the next 60 days. Owing to the lack of a full attendance the election of officers and the formal organization of the association was postponed until the next meeting, which will be held in the near future. The Clinton Works, of B. F. Keister & Co., of 44 ovens, having been sold to the H. C. Frick Company, will not be included in the association, which now stands as follows:

Works.	Owners.	Ovens.
Mammoth	J. W. Moore & Co.	508
Anchor	P. M. M. & S. Co.	100
Cora	J. Newmyer & Son	42
Dexter	J. R. Stauffer & Co.	40
Fairchance	Fairchance Furnace Co.	90
Fayette	Fayette Coke & Furnace Co.	120
Franklin	B. F. Keister & Co.	50
Hecla	Hecla Coke Co.	272
Home	Stauffer & Wiley	20
Kyle	Bliss & Marshall	127
Lemont	Robert Hogsett	134
Mt. Braddock		132
Mutual	Mutual M. & M. Co.	140
Overton	A. C. Overholt & Co.	110
Parrish	Dunbar Furnace Co.	70
Pennsville	Pennsville Coke Co.	38
Percy	Percy Milling Co.	62
Uniondale	Reid Bros.	76
Wynn	Wynn Coke Mining Co.	70
Youngstown	Youngstown Coke Co.	246
Total ovens		2,800

It is a noteworthy fact that the British steamship Ireland, one of the fastest passenger steamers in the world, uses salt

water in her boilers, jet condensers and 35-pound pressure. There were circumstances which dictated the adoption of this old-fashioned system as the best, one being the practical impossibility of getting in a sufficiently large low-pressure cylinder had compound engines been used.

The elevator capacity at Buffalo is to be enlarged to permit the storage and handling of grain at that port on a scale hitherto impossible.

NOVEMBER 27, 1888.

Loose Pin, Acorns.....
Loose Pin, Acorns, Japanned.....
Loose Pin, Acorns, Jap, Pltd, Tip....

Wrought Steel—	
Fast Joint, Narrow	dis 70x10 1
Fast Joint, Lt. Narrow	dis 70x10 1
Fast Joint, Broad	dis 70x10 1
Loose Joint, Broad	dis 70x10 1
Table Butts, Back Flaps, &c.	dis 70x10 1
Inside Blind, Regular	dis 70x10 1
Inside Blind, Light	dis 70x10 1
Loose Pin	dis 70x10 1
Bronzed Wrought Butts	dis 40x10 1

Calipers—See Compasses.

Calks, Tee	
Gutter	dis 5x6 1/2
Dewicks	dis 5x6 1/2
Can Openers	
Mason's Combs	dis 25 1/2
American	dis 25 1/2
Duplex	dis 25 1/2
Lyman's	dis 25 1/2
No. 4, French	dis 25 1/2
No. 5, Iron handle	dis 25 1/2
Bureau	dis 25 1/2
Sardine Sissors	dis 25 1/2
Star	dis 25 1/2
Sprague, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 25 1/2
World's Best, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 25 1/2
Universal	dis 25 1/2
Domestic	dis 25 1/2
Champion	dis 25 1/2

Guards	
Horse and Curry	dis 10x10 1
Cotter	dis 10x10 1
Wool	dis 10x10 1

Carpet Stretchers	
Cast Steel, Polished	dis 25 1/2
Cast Iron, Steel Points	dis 25 1/2
Socket	dis 25 1/2
Ballard's	dis 25 1/2

Carpet Sweepers	
Bissell No. 1	dis 25 1/2
Bissell No. 2	dis 25 1/2
Bissell Grand	dis 25 1/2
Grand Rapids	dis 25 1/2
Crown Jewel	dis 25 1/2
Magie	dis 25 1/2
Jew	dis 25 1/2
Improved Parlor Queen, Nickel	dis 25 1/2
Improved Parlor Queen, Japaned	dis 25 1/2
Excelsior	dis 25 1/2
Garland	dis 25 1/2
Parlor Queen	dis 25 1/2
Housewife's Delight	dis 25 1/2
Queen	dis 25 1/2
Queen, with band	dis 25 1/2
King	dis 25 1/2
Weed Improved	dis 25 1/2
Hub	dis 25 1/2
Cog Wheel	dis 25 1/2
Conqueror	dis 25 1/2
Easy	dis 25 1/2
Monarch	dis 25 1/2
Goshop	dis 25 1/2
Advance	dis 25 1/2
Ladies' Friend, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 25 1/2
American	dis 25 1/2
Grand Republic	dis 25 1/2

Cartridges—See Ammunition.

Casters	
Red	dis 25 1/2
Black	dis 25 1/2
Deep Socket	dis 25 1/2
Yale Casters, list May, 1888	dis 25 1/2
Yale, Gem	dis 25 1/2
Yale's Patent (Phoenix)	dis 25 1/2
Yale's Anti-Friction	dis 25 1/2
"Giant" Truck Casters	dis 25 1/2
Stationary Truck Casters	dis 25 1/2
Castle	dis 25 1/2
Humason, Beckley & Co.'s	dis 25 1/2
Sargent's	dis 25 1/2
Blackie's	dis 25 1/2
Peck Stow & W. Co.	dis 25 1/2

Chains

Traces, 3-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 3-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 7-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 7-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 7-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 7-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 7-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 7-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 7-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1
Traces, 7-10-2, exact sizes, 1/2 pair, 11 08	dis 50x10 1

Covert Halters, Hitching and Breast

Covert Halters	dis 25 1/2
Covert Traces	dis 25 1/2
Oneida Halters	dis 25 1/2
Savannah Pump Chain	dis 25 1/2
Jack Chain, Iron	dis 25 1/2
Jack Chain, Brass	dis 25 1/2
Chalk, White	dis 25 1/2
Red	dis 25 1/2
Blue	dis 25 1/2
White Crayons	dis 25 1/2
Chalk Lines—See Lines	

Chisels

Good Working and Firmer	
P. S. & W.	dis 25 1/2
New Haven and Middlesex	dis 25 1/2
Mix	dis 25 1/2
Ohio Tool Co.	dis 25 1/2
Buck Bros.	dis 25 1/2
Merrill	dis 25 1/2
U. & J. White	dis 25 1/2
Wetherby and Douglass	dis 25 1/2
Tanged Firmers	dis 25 1/2
Tanged Firmers, Butcher's	dis 25 1/2
Tanged Firmers, Spear & Jackson's	dis 25 1/2
Tanged Firmers, Buck Bros.	dis 25 1/2
Cold Chisels	dis 25 1/2

Chucks

Beach Patent	dis 25 1/2
Morse's Adjustable	dis 25 1/2
Danbury	dis 25 1/2
Syracuse, Bal Pat.	dis 25 1/2
Clamp	dis 25 1/2

Clamp

Providence Tool Co.'s Wrought Iron	dis 25 1/2
Adjustable, Gray's	dis 25 1/2
Adjustable, Lumber's	dis 25 1/2
Adjustable, Snow's	dis 25 1/2
Adjustable, Hammer's	dis 25 1/2
Adjustable, Stearns	dis 25 1/2
Stearns' Adjustable Cabinet and Corner	dis 25 1/2
Cabinet, Sargent's	dis 25 1/2
Carriage Makers', Sargent's	dis 25 1/2
Sherrard Mfg. Co.	dis 25 1/2
Warner's	dis 25 1/2
New Clamps	dis 25 1/2

Clips

Norway, Axle, 1/2 & 5-16	dis 55x5 1/2
Second grade Norway Axle, 1/2 & 5-16	dis 55x5 1/2
Superior Axle Clips	dis 55x5 1/2
Norway Spring Bar Clips, 5-16	dis 55x5 1/2
Wrought-Iron Pallor Clips	dis 55x5 1/2
Steel Pallor Clips	dis 55x5 1/2
Baker Axle Clips	dis 55x5 1/2
Quebec	dis 55x5 1/2
Cocks, Brass—Hardware list	dis 40x10 1

Coffee Mills

Box and Side, List revised Jan. 1, 1888	dis 50x2 1/2
American Enterprise Mfg. Co.	dis 50x2 1/2
The "Swift" Lane Bros.	dis 50x2 1/2
Compasses, D. Viderra, &c.	
Compasses, Calipers, Dividers	dis 70x7 1/2
Semis & Call Co.'s Dividers	dis 60x5 1/2
Semis & Call Co.'s Compasses & Calipers	dis 50x5 1/2
Semis & Call Co.'s Wing & Inside or Outside	dis 50x5 1/2
Semis & Call Co.'s Double	dis 50x5 1/2
Semis & Call Co.'s (Call's Patent Inside)	dis 50x5 1/2
Excelsior	dis 50x5 1/2
Stevens & Co.'s Calipers and Dividers	dis 25x10 1
Starrett's Spring Calipers and Dividers	dis 25x10 1
Starrett's Lock Calipers and Dividers	dis 25x10 1
Starrett's Combination Dividers	dis 25x10 1
Coppers' Teels	
Sutton's	dis 20x5 1/2
Sutton's	dis 20x5 1/2
L. & J. White	dis 20x5 1/2
Albertson Mfg. Co.	dis 25x5 1/2
Beatty's	dis 40x5 1/2
Stanbury Tool Co.	dis 40x5 1/2

Corkscrews

Sumner & Beckley Mfg. Co.	dis 40x5 1/2
Johnson's Patent	dis 35x5 1/2
Howe Bros. & Hubert	dis 35x5 1/2

Corn Knives and Outlets

Bradley's	dis 10x5 1/2
Wadsworth's	dis 25x5 1/2
Cradles—Grain	dis 50x5 1/2
Orow Bars—Cast Steel	dis 25x5 1/2
Iron, Steel Points	dis 25x5 1/2

Curry Combs

Fitch	dis 50x10 1
Rubber	dis 50x10 1
Perfect	dis 50x10 1

Curtain Pins—Silvered Glass

White Enamel	dis 25x5 1/2
Outlets	dis 25x5 1/2
Beaver Falls and Booth's	dis 35x5 1/2
Wostenholme	dis 35x5 1/2

Dampers, &c.

Dampers, Buffalo	dis 50x5 1/2
Buffalo Damper Clips	dis 50x5 1/2
Crown Damper	dis 40x5 1/2
Excelsior	dis 40x5 1/2

Deer Springs

Deer Springs	dis 25x5 1/2
Gray's	dis 25x5 1/2
See Rod	dis 25x5 1/2
Warner's No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 25x5 1/2
Star (Coll), list April 15, 1888	dis 25x5 1/2
Victor (Coll)	dis 25x5 1/2
Champion (Coll)	dis 25x5 1/2
Philadelphia	dis 25x5 1/2
Cowell's, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 25x5 1/2
Rubber, complete	dis 25x5 1/2
Shaw Door Check and Spring	dis 25x5 1/2
Elliot's Door Check and Spring	dis 25x5 1/2

Drawing Knives

P. S. & W.	dis 75x5 1/2
Mix	dis 75x5 1/2
New Haven and Middlesex	dis 75x5 1/2
Merrill	dis 75x5 1/2
Watrous	dis 75x5 1/2
L. & J. White	dis 75x5 1/2
Bradley's	dis 75x5 1/2
Adjustable Handle	dis 75x5 1/2
Wilkinson's Folding	dis 75x5 1/2

Drill and Drill Stocks

Blacksmith's Self-Feeding	dis 75x5 1/2
Breast, P. S. & W.	dis 75x5 1/2
Breast, Wilson's	dis 75x5 1/2
Breast, Millers Falls	dis 75x5 1/2
Breast, Bartholomew's	dis 75x5 1/2
Ratchet, Merrill's	dis 75x5 1/2
Ratchet, Agnew's	dis 75x5 1/2
Ratchet, Parker's	dis 75x5 1/2
Ratchet, Whitney's	dis 75x5 1/2
Ratchet, Weston's	dis 75x5 1/2
Ratchet, Moore's Triple Action	dis 75x5 1/2
Whitney's Hand Drill, Plain, \$11.00, Adjustable	dis 75x5 1/2
Wilson's Drill Stocks	dis 75x5 1/2
Automatic Boring Tools	dis 75x5 1/2

Twist Drills

Morse	dis 50x10 1
Standard	dis 50x10 1
Syracuse	dis 50x10 1
Cleveland	dis 50x10 1
Williams	dis 50x10 1
Drill Bits—See Augers and Bits	
Drill Chucks—See Chucks	

Dripping Pans—Small sizes

Large sizes	dis 25x5 1/2
Small sizes	dis 25x5 1/2

Egg Beaters

Beater	dis 25x5 1/2
National	dis 25x5 1/2
Family (T. & S. Mfg. Co.)	dis 25x5 1/2
Kington (Standard Co.)	dis 25x5 1/2
Acme (Standard Co.)	dis 25x5 1/2
Duplex (Standard Co.)	dis 25x5 1/2
Rival (Standard Co.)	dis 25x5 1/2
Triumph (T. & S. Mfg. Co.)	dis 25x5 1/2
Advance No. 1	dis 25x5 1/2
Advance No. 2	dis 25x5 1/2
Bryan's	dis 25x5 1/2
Ayres Spiral	dis 25x5 1/2
Double (Hamblin & Russell Mfg. Co.)	dis 25x5 1/2
Easy (Hamblin & Russell Mfg. Co.)	dis 25x5 1/2
Triple (Hamblin & Russell Mfg. Co.)	dis 25x5 1/2
Spiral (Hamblin & Russell Mfg. Co.)	dis 25x5 1/2
Paine, Diehl & Co's	dis 25x5 1/2

Egg Poachers

Buffalo Steam Egg Poachers, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 25x5 1/2
Electric Bell Cooks—Wolfe's	dis 25x5 1/2
Bigelow & Dowse	dis 25x5 1/2
Emery	dis 25x5 1/2

Kegs, &c.

Kegs, 1/2 b	dis 25x5 1/2
Kegs, 3/4 b	dis 25x5 1/2
Kegs, 1 b	dis 25x5 1/2
Kegs, 1 1/2 b	dis 25x5 1/2
Kegs, 2 b	dis 25x5 1/2
Kegs, 3 b	dis 25x5 1/2
Kegs, 4 b	dis 25x5 1/2
Kegs, 5 b	dis 25x5 1/2
Kegs, 6 b	dis 25x5 1/2
Kegs, 7 b	dis 25x5 1/2
Kegs, 8 b	dis 25x5 1/2
Kegs, 9 b	dis 25x5 1/2
Kegs, 10 b	dis 25x5 1/2
Kegs, 11 b	dis 25x5 1/2
Kegs, 12 b	dis 25x5 1/2
Kegs, 13 b	dis 25x5 1/2
Kegs, 14 b	dis 25x5 1/2
Kegs, 15 b	dis 25x5 1/2
Kegs, 16 b	dis 25x5 1/2
Kegs, 17 b	dis 25x5 1/2
Kegs, 18 b	dis 25x5 1/2
Kegs, 19 b	dis 25x5 1/2
Kegs, 20 b	dis 25x5 1/

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Mouse, Delusion.....	gross \$18.00, dis 15 %
Rat, "Decoy".....	gross \$10.00, dis 10 %
Ideal.....	gross \$10
Cyclone.....	gross \$5.25
Hotchkiss Metallic Mouse, 5-hole trans.....	dos 900
Trowels.....	dos 750
Read's Brick and Plastering.....	dis 75 %
Diston's Brick and Plastering.....	dis 25 @ 25-10
Peace's Plastering.....	dis 25 %
Clement & Maynard's.....	dis 30 %
Rose's Brick.....	dis 15 @ 20 %
Worrall's Brick and Plastering.....	dis 25 %
Garden.....	dis 30 %
Triers, -Butter and Cheese.....	dis 25 %
Trucks, Warehouse, &c.....	dis 25 %
B. & L. Block Co.'s list, 1882.....	dis 40 %
Tables, Boiler. -See Pipe	
No. 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000	

THE IRON AGE

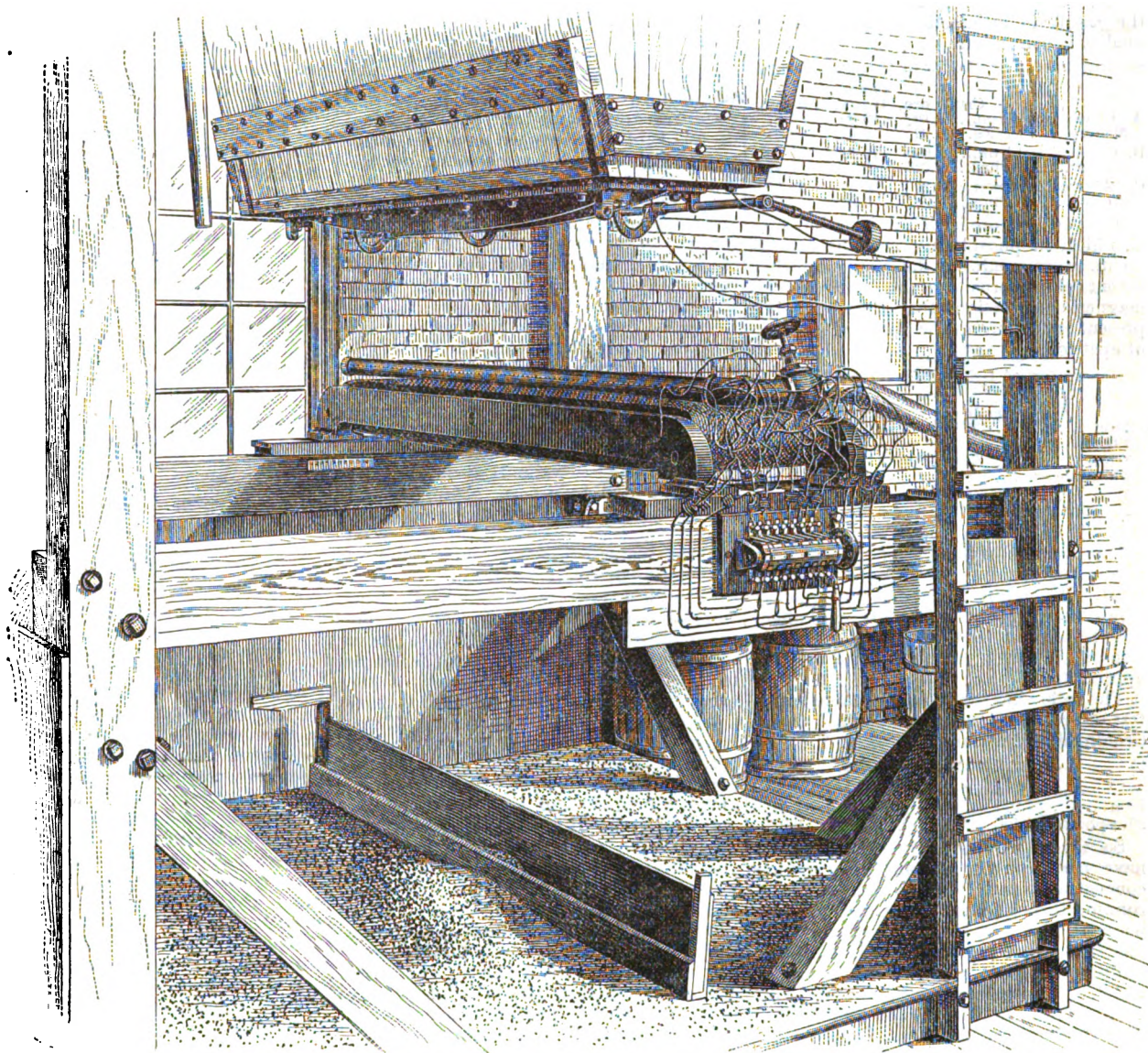
THURSDAY, DECEMBER 6, 1888.

The Edison Magnetic Separator.

After a series of experiments conducted over a considerable period, T. A. Edison has developed the magnetic separator invented by him into a practical machine. The principle upon which it is based is extremely simple, consisting, as it does, of deflecting by a powerful magnet those particles in a mixture of ore and gangue which are magnetic in their fall by

tograph was taken a number of minor changes have been made without affecting the general design. The ore which is first crushed and screened (this part of the apparatus not being shown in our engraving) is delivered by a bucket elevator into the hopper, shown in part in our engraving. In the bottom of this hopper is a long slit, which can be closed by a sharp-edged casting, balanced by the counterweight shown. Below the hopper is mount-

on either side of the projection to the floor of the line of the slot in the hopper, a slender, movable partition is placed in position on the floor. Now, there exists a narrow zone within which those particles collect which are only very slightly deflected particles of gangue, to which a minute speck of magnetite may adhere. In order to collect this material separately the partition is made in the form of a narrow box, which has been facetiously termed



THE EDISON MAGNETIC IRON ORE SEPARATOR.

its field. The quartz or other gangue falling by the magnet are not affected by its attraction. The particles of magnetite or of magnetic oxide are diverted from the vertical sufficiently to reach the floor at a point considerably removed from that which they would attain in a free fall. Given, then, a thin sheet of ore dropping by a broad magnet, the gangue accumulates immediately below the orifice from which the sheet fell, while the magnetic particles of the ore will be found separated from it. The accompanying engraving, from a photograph of the machine now in place at Edison's laboratory, at Llewellyn Park, N. J., will clearly show how this principle has been carried out. We may state, however, that since the pho-

ed the magnet, a casting weighing 3 tons in this case, around which are wrapped a series of coils of wire. To regulate the power of the magnet, the arrangement provided is shown, by which any desired number of the coils can be arranged in multiple arc or in series. In the apparatus as now modified, this arrangement is put out of the way, being mounted on the top of the magnet instead of at the side. A dynamo furnishes a current of 25 to 30 amperes and 110 volts. Since our engraving was made a hand-wheel and screw have been added to move the magnet forward or backward, as needed, scales being provided to record its exact position. In order to separate more sharply the gangue from the ore as it accumulates

the "mugwump." Lately a scale has been attached to the floor and to the wall, in order to facilitate the recording of the exact position of the "mugwump." Immediately above the magnet is a pipe with a series of perforations, through which jets of air, supplied by a fan, can be projected against the following sheet of material to be concentrated should it be considered desirable to remove the dust from the ore.

Experiments have been made on various ores with the Edison separator. Among those treated being ores from the Port Henry and Chateaugay mines, of the Lake Champlain district, and from the Croton mines in Putnam County, N. Y. The results of the separation have not been checked in every case by chemical analysis, and in

some instances the latter is not completed. We are in a position, through the courtesy of John Birkinbine, of Philadelphia, consulting engineer of T. A. Edison, to place the following data before the readers of *The Iron Age*.

Witherbees, Sherman & Co., of Port Henry, N. Y., have had a number of separations made of two classes of ore which their mines produce—viz., the "New Bed Lean" and the "Old Bed Ore." The former is within the Bessemer limit as to phosphorus, but it is a part of the material mined with the richer ore of the vein. The object of the separation would be to remove the silica, which is present in so large a quantity as to prevent the advantageous shipment of the ore to the furnaces. The following analyses shows that the result is satisfactory, so far as the quality is concerned:

Separation of New Bed Lean Ore, Port Henry.

	Crude ore.	Concentrates.	Tailings.
A. Crushed to 20 mesh.....	Iron.....53.20 Phos.... 0.03	69.90 0.01	7.67 0.08
B. Crushed to 10 mesh.....	Iron.....51.60 Phos.... 0.025	70.00 0.018	7.80 0.41
C. Above 10 mesh.....	Iron.....52.20 Phos.... 0.032	68.80 0.013	18.70 0.085

The Old Bed ore is rich in iron, but it is also high in phosphorus, and the experiments were made to determine to what extent phosphorus can be removed by magnetic separation, that element being present in the ore in the form of crystals of apatite.

Separation of Old Bed Ore, Port Henry.

	Crude ore.	Concentrates.	Tailings.
Iron.....	59.5	69.15	7.10
Phosphorus.....	1.77	0.41	11.08
Iron.....	62.0	70.90	9.25
Phosphorus.....	1.46	0.18	10.54
Iron.....	64.20	71.20	9.00
Phosphorus.....	1.39	0.31	11.57

It will be observed that while a considerable proportion of the phosphorus has been eliminated it is still above the Bessemer limit. When it is considered how quickly a few stray crystals of apatite will affect the result the delicacy of the operation of removing the phosphorus will be appreciated.

The following result was obtained in a test of ore from the waste dump of the Croton mine, Putnam County, N. Y.:

Separation of Croton Ore.

	Crude ore.	Concentrates.	Tailings.
Iron.....	37.97	64.72	11.04
Phosphorus.....	0.38	0.10	0.97

So far as we know the tests thus far have not been carried out by weighing concentrates and tailings produced by running through large quantities. It may be well, however, to call attention to the fact that a high percentage of iron in the tailings does not imply a heavy loss of metal. A simple computation will prove this. Thus, in the case of sample A of Port Henry, New Bed Lean, if there were no waste, the loss of iron represented by tailings carrying 7.67 per cent. would be only 3.86 pounds in 100 pounds of the metal contained in the original ore.

Mr. Edison has not, however, confined himself to magnetites. He has experimented with roasting non-magnetic ores, in order to first convert its oxide into the magnetic oxide, and then putting it through his machine. The possibilities of handling titaniferous ores have also been taken into consideration. One of his machines is now being put up in Michigan, and others have been ordered.

Light, Heat and Power reports that the new holder built by R. D. Wood & Co., of this city, for the Peoples Gas Light and Coke Company, of Chicago, has been finished and accepted by the company. The history of this holder is somewhat peculiar. It has a capacity of about 3,100,000 feet, covers about seven-tenths of an acre, and has been entirely finished within five months of the time it was started. The

contract signed by the builders called for the completion of two-thirds of the holder this month. The builders have delivered the holder fully finished, complete in all details, and in working condition, ten days in advance of the time set for the finishing of the two-thirds. The pressures on this holder are forty-four, sixty-five and and eighty-six tenths, respectively, with air.

The Bartlett Water Supply Scheme.

J. R. Bartlett has addressed to the Commissioners of the Sinking Fund of New York a communication from which we extract the following:

I respectfully call your attention to the great need of this city for an additional supply of water for domestic use, sanitary purposes and for the requirements of commerce and manufactures, and herewith submit for your consideration a proposition to furnish from some sources independent of the Croton water-shed an ample quantity of pure and wholesome water, not less than 50,000,000 gallons daily, or such larger quantity as may be desired to meet these demands, delivered under pressure, into the lower part of the city, from the storage reservoirs and sources of supply of the Society for Establishing Useful Manufactures, of the Lehigh Valley Railroad Company, lessees of the Morris Canal and Banking Company, and of the West Milford Water Storage Company, the Montclair Water Company, and other companies, and from the sources of the Passaic River and tributaries, and from Rockland and Orange Counties in the State of New York, all west of the Hudson River, a region adapted by nature to supply water in ample quantity and of unexceptionable quality, and the reservoirs of the West Milford Water Storage Company and of the Montclair Water Company are situated within convenient reach of New York, and at elevations sufficient to secure the requisite head pressure. The above sources of supply are known to be ample to meet all of the requirements of the cities of Northern New Jersey, and to leave a surplus applicable to your needs. These waters will be conducted in pipes or in a permanently constructed aqueduct to the Jersey City shore of the Hudson River, under which, through a tunnel, the water will be conducted in suitable pipes of ample strength to secure absolute safety, guaranteeing a continuous flow of the waters required under a head pressure of at least 300 feet, delivered at such a point on the west side of the lower part of the city of New York as your honorable board may determine, within three years from date of contract, at the price of \$75 per 1,000,000 gallons, payable quarter-yearly after delivery shall have commenced. In this plan all Interstate questions are avoided, all riparian rights protected, and the waters from the sources mentioned will be in addition to the ample quantities provided for all the cities and towns in New Jersey dependent upon the Passaic watershed for their supplies.

It is difficult, says *Engineering*, to measure the total resistance of a large battery of accumulators owing to the smallness of this resistance and the high electromotive force of the battery. J. D. Dallas has, however, pointed out a method of overcoming these difficulties by coupling up the battery when composed of an odd number of cells, so as to form two batteries, one consisting of $\frac{n+1}{2}$ cells, and the other of $\frac{n-1}{2}$. The resultant electromotive force is then that due to a single cell, and the resistance can easily be determined.

Endless Rope Hoist for Shafts.

At the last meeting of the Engineers Club of Philadelphia, a description was presented by A. H. Storrs of Poore's endless rope hoist for shafts.

This system of hoisting is said to be particularly applicable to shafts of great depth. The advantages claimed are that it enables smaller engines to do the work, and effects a saving, as against the ordinary engines with drums, of about 50 per cent. in the first cost of the plant, and greatly decreases the running expenses, owing to the much smaller steam consumption; the ropes, working altogether in straight lines, should be longer lived; and worn out hoisting ropes can be used for tail ropes; the cages run with less oscillation, the length of the rope is easily adjusted; and there is decreased danger of overwinding. The plant, as put in at the Neilson Colliery of J. Langdon & Co., Inc., consists of a pair of 28 x 60-inch horizontal engines, with a pair of wood-faced rope sheaves and brake wheel, all 14 feet in diameter, placed on the crank shaft. In addition to the regular brake for controlling the engines, an extra brake is provided with which the engineer can clamp the hoisting rope into the grooves of the engine sheaves in case of an emergency, such as the breaking of a rope. The tower head sheaves are 12 feet in diameter.

The hoisting rope is made of special steel, $1\frac{1}{4}$ inch in diameter, with a hemp center, and runs from one cage over the head sheave to one of the engine sheaves, thence to and around a transfer sheave to the other engine sheave, and over the other head sheave to the other cage. The cages are also connected by an $1\frac{1}{4}$ inch iron wire tail rope, running from the bottom of one cage around a small sump sheave at the bottom of the shaft and to the bottom of the other cage. This sump sheave hangs in the bight of the tail rope, and is free to move on vertical guides. The transfer sheave, before mentioned, is a wrought spoke wheel about 16 feet in diameter, so set that it can be moved toward, or away from, the engine sheaves, thus adjusting the length of the rope, and its position is always such that the lines of pull of the ropes are tangents both to itself and to the engine sheaves, thus avoiding any side wear on the grooves or rope. The total hoist is about 1380 feet. The cages weigh 3 tons each and an empty car about $1\frac{1}{4}$ tons. The cars carry from $2\frac{1}{4}$ to 3 tons of coal or rock. The cages, cars and ropes being perfectly balanced, the load in the car and the friction of the machinery is all that the engines have to overcome, and, as this load is constant all through the hoist, a steadier engine speed is obtained than with drums.

A torpedo boat may be pierced in several places at or below the water line, and yet flotation may be secured by moving at a high speed. This has been proved by an interesting experiment tried by the English builders, Messrs. Thornycroft & Co., in a new boat. A hole of $\frac{1}{4}$ inch diameter was made in the side, about 1 foot under water, and when the boat was at rest the water flowed in very rapidly, but when moving at a speed greater than 10 knots per hour a skin of water was drawn over the hole, which resisted any inflow.

A natural gas vein of great power was penetrated on the 26th ult., at a point nine miles northeast of Tuscola, Ill., in the Champaign district. A well, which was being bored for water, had reached a depth of 367 feet, when water and rocks were forced out of it high in the air. A pipe was inserted and the gas ignited, the resulting flame being 30 feet high.

Arch Presses for Sub-Pressing.

The manufacture of the parts of clocks, watches and other similar work by the aid of sub-presses calls for a different construction of press for working the sub-press than that ordinarily used for blanking and punching sheet metal. We illustrate on this page three different sizes of these presses, built by Messrs. Blake & Johnson, of Waterbury, Conn., including one to be worked by foot and two sizes of power presses. The larger of the power presses is designed to cut out, by the aid of the sub-press, pieces similar to clock frames from sheet metal, and make all the apertures of whatever shape that may be required in the frame, at one motion of the plunger, thus accomplishing at one stroke the work which by the old method re-

has prosecuted this work, gradually increasing the depth as the transatlantic vessels have increased in size. From 1873 to 1887 the seagoing trade of Montreal increased from 412,478 tons to 870,773, and it is expected that next year the tonnage will be upward of 1,000,000.

The Ohio River Valley.

The corn crop of the Ohio River Valley this season is one of the largest that was ever produced, and although the heavy rains and high water have injured the quality in some localities, the yield is enormous. The valley producing corn commences about 30 miles above Louisville, Ky., and extends almost uninter-

tracted, the slop is fed to perhaps millions of cattle and hogs. Besides the corn crop of this region, on the Kentucky side is the heaviest producing tobacco district of the West.

Lying in this favored agricultural country, there is no wonder that the cities of Owensboro, Mt. Vernon, Henderson, Evansville and Paducah are flourishing. Evansville and Paducah are contiguous to one of the finest timber sections of the State of Kentucky. The former is the largest hardwood market in the West, and her manufacturing interests are furthered by cheap fuel, for the city and surrounding country are underlaid with coal, which is delivered at 75 cents per ton for steam purposes. Quite a number of well-known foundries and machine shops are located there, besides plow and wagon works.

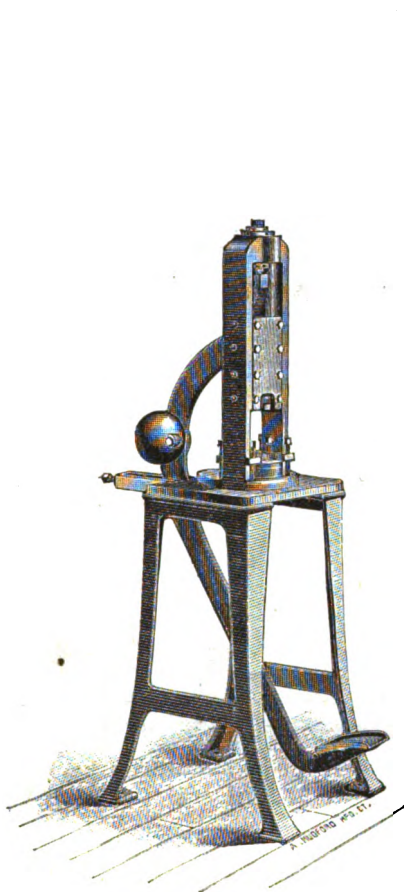
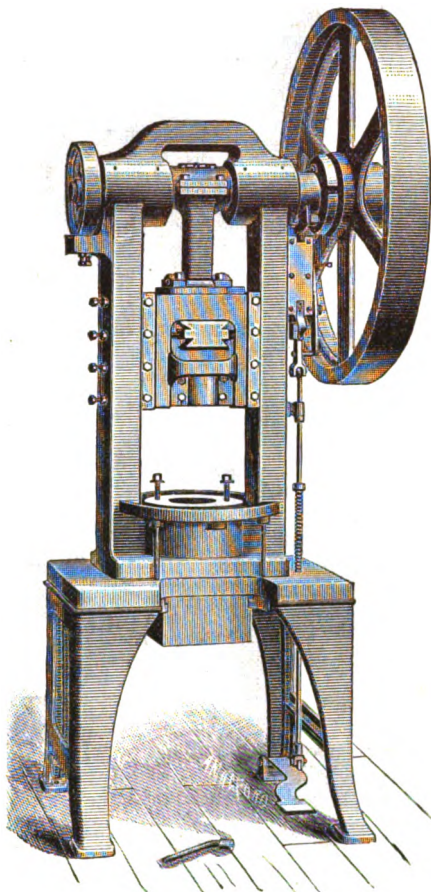


Fig. 1.—Foot Press.



Figs. 2 and 3.—Power Presses.

ARCH PRESSES FOR SUB-PRESSING, BUILT BY MESSRS. BLAKE & JOHNSON, WATERBURY, CONN.

quired several operations. The smaller power press and the foot press are designed for the smaller parts of watches that are made from sheet metal. These presses are of a form that gives to them great rigidity, which is a very important point in working sub-press. The adjustment of the plunger is accomplished by means of a wedge and screw, the wedge being carried forward or backward by the screw as may be necessary to carry the dies and punches into proper position to do their work. This device works very accurately, and admits of very close adjustment.

Blake & Johnson build eight sizes of the power presses for sub-pressing, ranging in weight from 400 pounds to 4000 pounds.

The official opening of the deepened ship channel from Montreal to Quebec took place recently. A clear water depth of 27½ feet throughout has now been secured, "except at a few points which can be finished by the time of low water next fall." For many years the Government

ruptedly on both sides of the river down to Cairo, Ill., in some places broadening out 10 miles in width on one side. For instance, the Louisville and Nashville Railroad runs on a trestle and embankment from Henderson, Ky., to Evansville, Ind., over a corn field for 10 miles. On the Wabash River, which runs between the States of Illinois and Indiana and empties into the Ohio, is probably the largest body of the great corn-producing lands; here the fields are from 15 to 25 miles wide.

Near this locality, at Mt. Vernon, Ind., is one of Hudnut's grists and hominy mills that grinds 3000 bushels of corn per day. This is supplied by a steady stream of farm wagons, the railroad, and a steamer owned by the mill and employed entirely in transporting the corn crops from up and down the river to the mill. Most of this corn along the valley is manufactured into breadstuff, starch and feed meal, at the different cities, but much of it is consumed by the distilleries of Kentucky and Illinois, where after the spirits are ex-

Henderson has a fine and most successful cotton mill, and has five or six tobacco warehouses used for stemming and packing the leaf for foreign shipment. Paducah is more pretentious. It lies at the junction of the Cumberland and Tennessee rivers with the Ohio, and is the transfer point for cargoes to and from those rivers. Within a few miles of the city, between the Cumberland and Tennessee, lie beds of fine deposits of brown ore, which, together with other attractions, such as cheap fuel, lime rock, shipping facilities, and a bonus from the city, induced St. Louis capital to erect a furnace in the city limits. The Forsman Soft Steel Company is established near by, which, if successful, will take the entire output of the furnace. This process, for which a patent has just been granted, converts any kind of melted iron, regardless of properties, into steel, as it runs from the furnace or cupola, into either castings or ingots for rolling. Already a rail mill is contemplated in connection.

Improved Feed-Grinding Mills.

A few months since we briefly described an improved form of feed-grinding mill made by the Foos Mfg. Company, of Springfield, Ohio. We take special pleasure, therefore, in presenting in this issue engravings which more clearly explain the main features of the design.

Of the illustrations on this page Figs. 1 and 2 show a mill divided at the shaft and the upper part raised, so that the inside can be seen. This is done by simply removing two nuts. The ease of access to the working parts of the mill for examination will be of interest to all considering

The crusher or conveyer on the main shaft is represented at M, and is shown in detail in Fig. 4. The crusher A is cast with a recess in one of the lugs, B, from the inside, into which is dropped the head of a bolt, C, long enough to extend clear through the hub of the running plate head D. It is then fastened securely in place by a nut which is held in place (so it cannot possibly work loose) by one of the company's own nut locks. The crusher is locked to the running head by a tenon on the end of the crusher, engaging with one on the head. Thus the crusher cannot move around on the shaft, nor backward or forward, but is held firmly in place. It

It will sometimes happen, however, that pieces of iron will get into a mill too large to work through the crusher box to the plates, so that before the pin breaker gets an opportunity to act the damage is done. To prevent accidents of this kind a safety bottom is provided. This is shown in Fig. 5. The lower case or main frame A A is cast without any bottom. At the point directly under the crusher B on the shaft is a separate casting or bottom, C, which fits closely and tightly in the space left in the lower case; and this is held in place by a bar or lever, D, hung at each end on bolts E E. These bolts are drawn up so that the bar holds the casting or

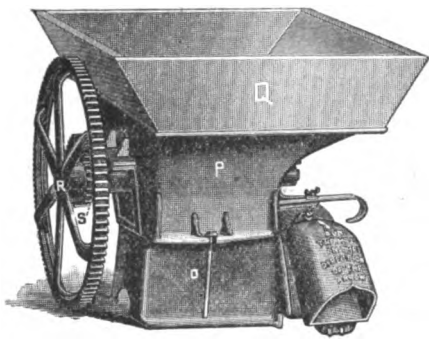


Fig. 1.—View of Hopper Arrangement.

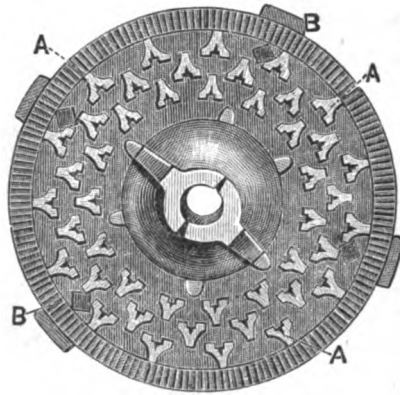


Fig. 3.—Grinding Plates.

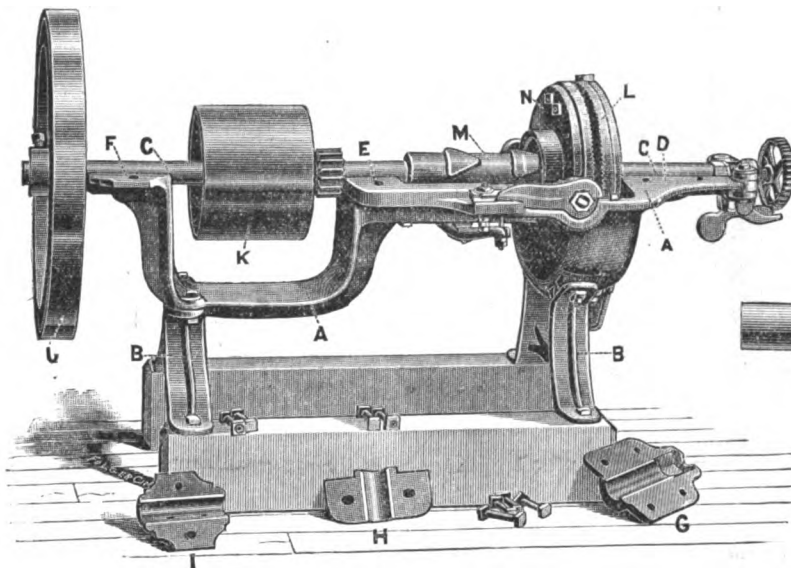


Fig. 2.—General View of Mill.

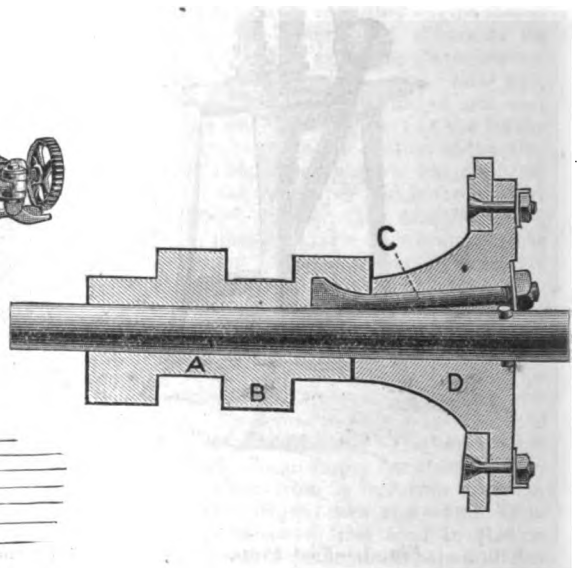


Fig. 4.—The Crusher.

GRINDING MILL, BUILT BY THE FOOS MFG. COMPANY, SPRINGFIELD, OHIO.

the purchase of such a machine. The lower case or main frame A of the mill is made in one continuous casting. The legs B B, upon which it rests, and to which it is securely bolted, are heavy castings. The shaft C is of cold-rolled steel, and of ample size in each mill to carry the largest pulleys and belts which may be desired. It runs on three long bearings, D E F, all in the single casting or main frame, so that these bearing are always in line. The journals are all made in half boxes, and can easily be adjusted when any wear occurs. All the bearings are babbitted, and will run for years before wearing out. The fly-wheel, pulley and running head J, K, L, respectively, are each carefully balanced separately before being put on the shaft. The fly-wheel is of special design, and turned on the face and both sides.

can, however, be easily removed if desired. Nuts, bolts or set screws are thus dispensed with inside the crusher-box, and cannot work loose and get into the plates.

While every precaution is taken to guard against pieces of iron or other dangerous material getting into the mill, an accident of this kind may happen. To avoid any serious breakage, therefore, the makers use a pin breaker, which consists of a wooden connecting pin in the yoke holding the temper screw. Any hard substance, as a nail or spike, coming between the plates will break this pin, the yoke and screw will be thrown to one side, thus relieving the pressure on plates, which will separate as shown, and the nail or other article will drop below and can be removed at lower spout. A new pin can be put in the yoke and the mill is again ready for work. This device has proved very efficient.

bottom firmly in place. The bar is sufficiently strong for all kinds of grinding, or any legitimate work, but should any piece of iron or other substance, as shown at G, too hard to grind get into the mill it will cause the bar to break at the point F, where it bears against the bottom (as that is the weakest point), when the casting or bottom will fall out, as shown by dotted lines. No damage is done to the mill, and the casting can be replaced in a moment by using another bar, a number of which are furnished with each mill. The value of these two features will be readily appreciated.

Returning to Fig. 2 we would explain that to the still head N and the running head L are bolted the grinding plates. One set of these are shown in Fig. 3. It will be noticed that the plan is that of gradual reduction. First, there are large

ribs on the running plates, close around the shaft, which lack less than $\frac{1}{4}$ inch of coming in contact with corresponding ribs on the still plate. These ribs engage the grain, small pieces of cob, &c., which have been broken by a breaker, and further reduced by the crusher or conveyer on shaft, and reduce them to small, uniform pieces, so that a large per cent. of the work, fully one-half, is done close to the shaft within a radius of about $2\frac{1}{2}$ to 3 inches. Then come numerous small (A-like figures) A, which stand nearly $\frac{1}{4}$ inch above the surface of the plates. These have sharp edges and cut the small pieces of grain, &c., as they pass from one to the other. Then comes a ring of fine reversed inclines, B B, extending entirely around the outer edge of both running and still plate. These take the grain, now reduced to small, gritty particles, and by rubbing reduce a portion of the product to a soft, floury meal. The metal used for the grinding plates is a special mixture of great hardness. The A-shaped figures, as

are thrown or shoveled into the hopper, and upon the double breakers, the entire length of which engages the ears, keeping them in constant motion or agitation, so they cannot clog or bridge over. The broken pieces of cobs and grain pass to the crusher on the main shaft, where they are still further reduced, as already explained, and conveyed to the plates to be ground to the desired fineness. The large slide is used to regulate amount of crushed cobs to be ground.

Heating Coke Ovens by Natural Gas.

From a recent issue of the *Pittsburgh Times* we take the following:

The experiment of heating coke ovens by natural gas has been tried in the Connellsville region with success. The Central Connellsville Coke Company, supplied by the Southwest Natural Gas Company, has used it for some time and is satisfied with the results. The Walston Company,

ovens which did not work regularly. For a set of, say 100, ovens which were kept in constant fire no lighting apparatus was needed, and, as far as the first drawing is concerned, the $3\frac{1}{2}$ tons per oven which are fit for blast furnaces would not entail any serious loss. The gas-lighting project is a good thing, but too much of a good thing for coke producers with a steady business to indulge in.

The Kansas City Foundry and Machine Company.

The Kansas City Foundry and Machine Company, of Kansas City, Mo., have within the past month opened their new works at Manchester, a manufacturing suburb of Kansas City. They are located in the beautiful Blue Valley, through which pass the Southwestern branch of the Missouri Pacific Railway and the Kansas City and Southern Railway. They are in close proximity to the Kansas City Switch and Frog Works, the new shops of the Cookson Iron Works and the Mid-Continent Boiler Works.

The buildings are constructed wholly of brick, with trussed roofs, and all are one story in height. Twenty men are now employed in the foundry, and about the same number in the machine shop. The machine-shop engine is a center crank, of 35 horse-power, built by T. M. Nagle, of Erie, Pa. The foundry engine is a 20 horse-power upright. The boiler capacity of the works is 130 horse-power, furnishing steam not only for their own purposes, but also for the Cookson Iron Works and the Mid-Continent Boiler Works. The melting capacity of the foundry cupola is 10 tons.

The company was incorporated May 28, 1888, and the buildings were completed August 1. F. B. Ray is president, T. C. Bradley is vice-president, and the foundry department is under the management of George Hurley, for many years foreman of David Creswell's foundry, in Philadelphia. The foundry is adapted to the production of both heavy and light castings, while the machine shop is specially fitted for manufacturing hardware specialties, novelty work, &c. The company are meeting with encouraging success in the demand for their iron, bronze and brass castings, making a specialty of light gray iron castings. They are sole manufacturers of the Lightning nail puller, Noiseless nail puller, and make the Fleming door hanger for the Fleming Door Hanger Company, of Kansas City.

There has been considerable controversy as to whether the Lash open-hearth furnace, which has been giving such excellent results in the Pittsburgh district, where natural gas is used, would work satisfactorily with the dirty producer gas as ordinarily manufactured in Siemens or Wellman gas producers. This question seems to have been fully demonstrated and finally settled to the entire satisfaction of all parties concerned by the results obtained at the works of the Standard Steel Casting Company, at Thurlow, Pa., who have a 20-ton furnace of this type, the gas for which is supplied by four Wellman producers. The items of labor, fuel and repairs are very much less than in the old form of open-hearth furnace, and the many advantages of the Lash furnace that have been demonstrated in working with natural gas as fuel have been carried out in the same degree in the case of producer gas. In a letter lately received by Messrs. Lean & Blair, Pittsburgh, the builders of the furnace, the Standard Steel Casting Company state that the 20-ton Lash steel melting furnace which has been in operation for several months past is giving them good results, and they are satisfied with the working of it on producer gas.

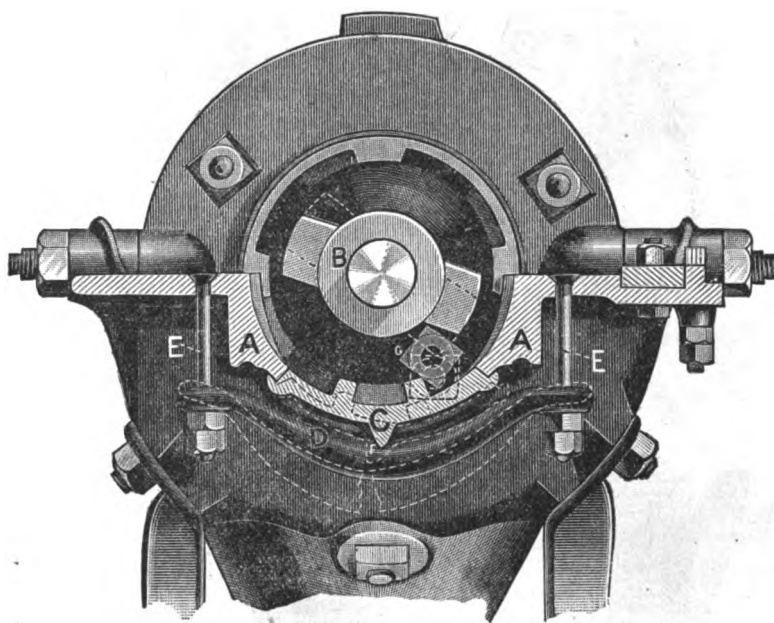


Fig. 5.—Selfy Bottom.

GRINDING MILL, BUILT BY THE FOOS MFG. CO., SPRINGFIELD, OHIO.

will be readily understood, must wear to the surface before becoming useless. The figures are alike on both sides, and when one side is used in grinding, the other side remains untouched, so that when one side becomes worn the mill can be run in the opposite direction, which is merely done by crossing the belt, changing the spout and gear wheel, and the other side of the figures, which are not worn in the least, is used, thus furnishing a fresh, new surface; and as these are used the action of the grain, it is claimed, sharpens the dull side. The plates are thus self-sharpening.

Suitable adjustments are provided for the plates in case of changing them, and for regulating for fine or coarse grinding. These are simple and easily made.

We should refer also to the double breakers with which each mill is fitted. These breakers, which are at the bottom of the feed-hopper of each mill, consist of two intergearing crushers, receiving motion direct from the main shaft by a gear-wheel, causing them to revolve toward each other. These crushers have fingers or lugs which catch the ears of corn and break the cobs in pieces. Directly under these breakers or crushers, and between them and the crusher on the main shaft, is a large slide which can be moved back and forth. The ears of corn

in Jefferson County, also tried the experiment about ten days ago and is satisfied with the results. The theory of the experiment is that by using wood to start the fire time for warming up a cold oven is much longer and the first drawing of coke is of an inferior quality. From the first results of the natural gas experiment, which gives first-class coke on the primary drawing, the idea has gained ground that the natural gas as a kindling will be universally adopted. A number of coke men expressed opinions on the subject yesterday, and the feeling was that the expense of the fixtures would be more than could be repaid by the improved quality of the first drawing. A representative of the H. C. Frick Company said that he knew the first drawing of the ovens lit with wood or coal was of an inferior grade, but that it could be used in blast furnaces. If any one who understood the practical working of ovens would think for a moment, they would see that they might run for two years continually, then perhaps lay off for anywhere from one to six months. Now, a gas fixture that can only be used once in two and one-half years would be rather an encumbrance. Some temporary provision might be made in the shape of a rubber pipe and burner, with fixtures which might be a good thing for

Improved Cable Railway Machinery.

On this and the opposite page we publish engravings of several new designs in the line of cable railway machinery, recently brought out by the Walker Mfg. Company, of Cleveland, Ohio.

A strikingly interesting piece of machinery is the 500 horse-power friction clutch coupling shown in Fig. 1. The outer member of this coupling is a plain, ordinary casting with eight arms and hub on the outside secured to the shaft. The inner member has a boss or center with four bored arms into which are fitted seg-

ments of the spring to force the segments toward the center of the shaft would have to be overcome by the wedges. The coupling is very effective and is doing good service at the Eighteenth Street Power House, in Kansas City, Mo. The sleeve is operated by a yoke and lever with worm and wheel and hand-wheel.

In Fig. 2 is shown a U frame and staggered arm-sheave. The U frame is cast in two pieces, so as to mold easily, and is hollow, with flanges in the center to bolt each half together. It also has ribs inside. The flanges form a backbone to the frame when bolted together. The sides are not

be a very difficult piece of work to turn out, but we understand that the Walker Mfg. Company's system of molding reduces it to quite a simple operation.

Figs. 3 and 4 represent sections of Walker's differential cable drums. They are shown in section so as to illustrate the loose differential rings on which the cable rests while in operation. It has long been known that the destruction to cables has been largely due to the grooves wearing irregularly in the solid drums. Owing to the severe strains to which the first groove on the receiving drum is subjected as a result of the varying loads the wear is

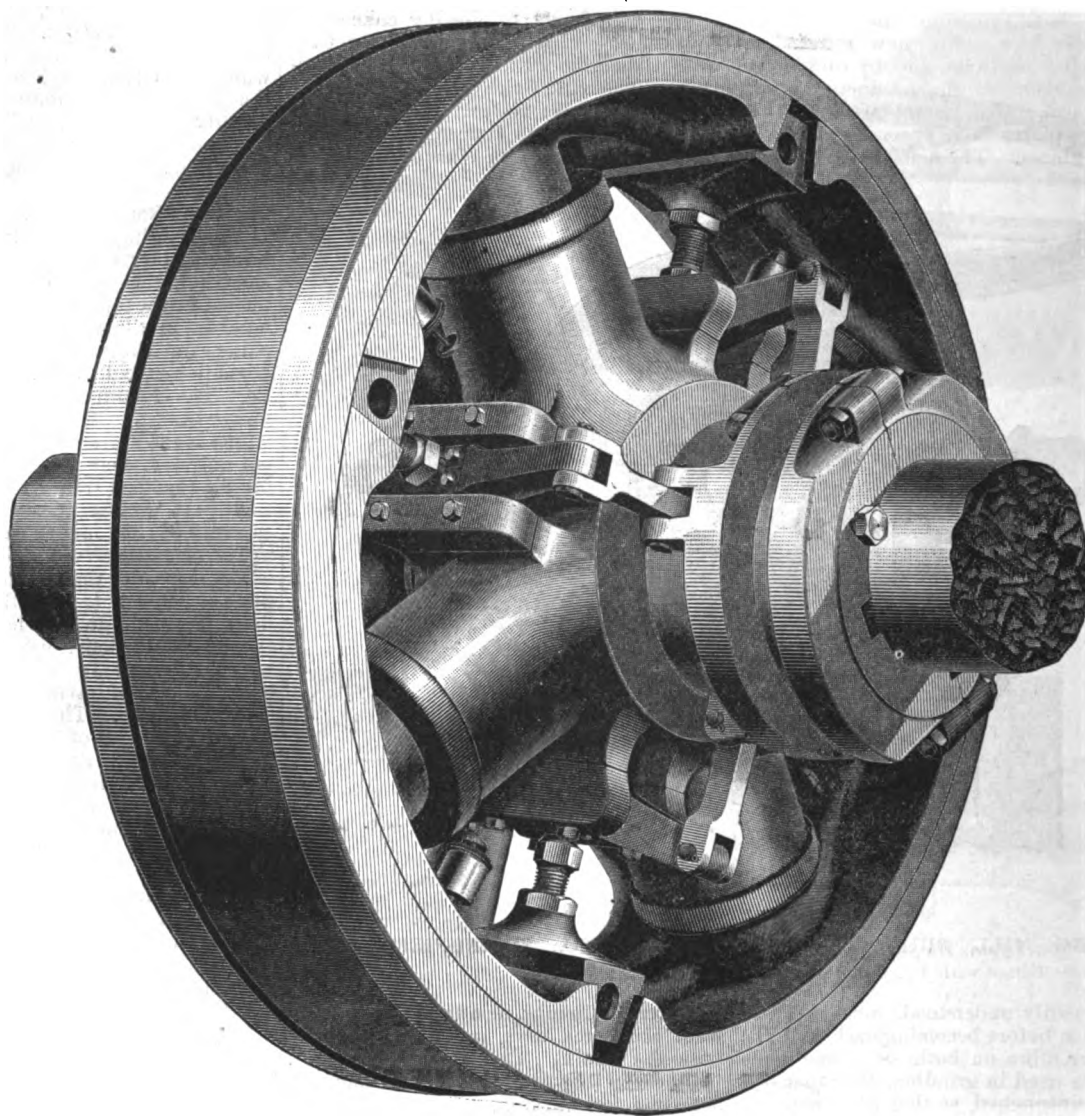


Fig. 1.—500 H.-P. Friction Clutch Coupling.

CABLE RAILWAY MACHINERY, BUILT BY THE WALKER MFG. COMPANY, CLEVELAND, OHIO.

ments with corresponding arms. The arm part of the segments is hollow and has an inner flange on which rests a spring through which a bolt passes and draws the segments toward the center of the shaft. This spring can be adjusted so as to make the segment clear the outer member any desired amount when the coupling is not engaged. There are four wedges at the ends of segments which are forced into position by adjusting screws and toggle levers attached to the sliding sleeve as shown. When these four wedges are forced out, the result is to lift each of the four segments in a direct line with the bore of the four arms and directly in opposition to the spring inside of the segment arm. The spring is adjusted only sufficiently to keep the segments away from the outer member, as any undue pressure

pierced with holes, as is common in such castings, to get the core out when cast in one piece. These holes make such castings quite weak, especially so as the metal forming the outside of the casting is of the greatest strength. The castings are securely bolted together and dowel-pinned before they are bored and fitted for the boxes. The sheave has staggered arms, which insures great rigidity for either horizontal or vertical motion. The principal advantage of the staggered-arm sheave is a uniform casting. As the arms do not come opposite each other, all undue strains, such as occur in straight-arm castings, are dispensed with. A great many of these sheaves have already been made of 8 feet, 10 feet and 12 feet diameter, with uniform success. As the sheave appears from an ordinary standpoint of molding, it would

very excessive on this first groove in comparison with its mates in the old style drum, in which the grooves were turned directly into the solid face of the drum. It is quite evident that after the wear progressed to such an extent as to make a very great difference in the circumference of this first groove and that of its mates it would require either stretching of the cable a given amount in each revolution of the drum equal to the difference in circumference of the smaller and larger grooves or slipping in the groove, either of which would be very detrimental both to the drum and to the cable. The differential drum dispenses entirely with any wear of the grooves or any wear of the cable while on the grooves. The cable enters on the fixed ring on the leading drum, shown in the section Fig. 3, and is

wound into the left-hand ring on the end drum and then back to the second ring on the leading drum, and so forth, putting as many wraps on as may be deemed necessary according to the length of the cable. It will be seen that all the rings in the drums are loose excepting the ring on which the cable is hauled in from the street. Should there accordingly be any inequality in the diameter of the rings, whether in first construction or by subse-

solid grooved drum without slipping of the cable in the grooves. Such slipping will wear the grooves and the cable also. When the cable is at work on the differential drums each wrap between the drums appears like a solid bar of iron, and the impression of the cable is left in the tar at the bottom of rings, which shows conclusively that there is no slipping of the cable in the rings. The latter have a diametrical friction, due to the pressure of

plished without any undue strain on the cable while passing over the drums. The bottom and sides of the rings are thoroughly lubricated by automatic grease cups inserted in the rim of the drums.

These differential drums, we understand, have been thoroughly tested at the 12th and Eighteenth Street Cable Railways, of Kansas City, Mo., and the St. Louis Cable and Western Railway Company, of St. Louis, Mo., where they have been giving

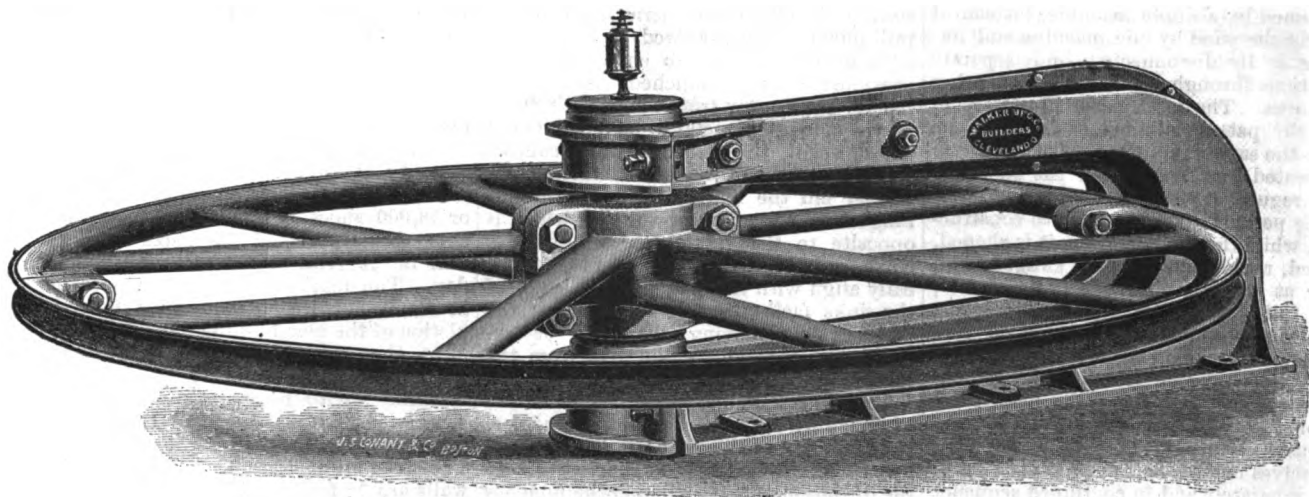


Fig. 2.—U-Frame and Sheave with Staggered Arms.

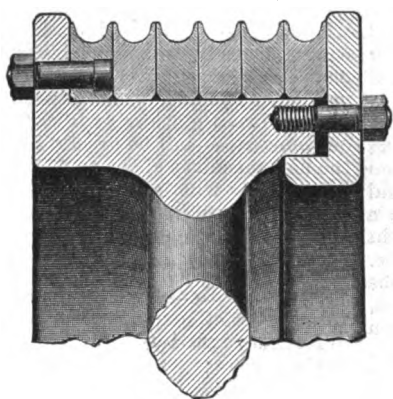


Fig. 3.—Leading Drum, Having Initial Ring Secured and 5 Loose Rings with Frictional Adjustment.

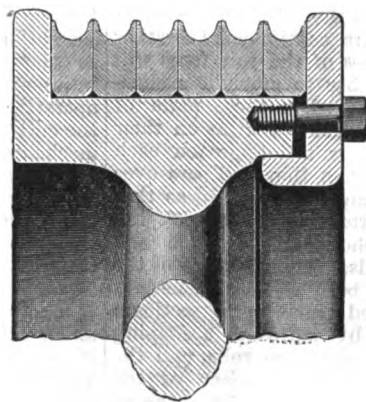


Fig. 4.—End Drum, Having 6 Loose Rings with Frictional Adjustment.

Figs. 3 and 4.—Walker's Differential Cable Drums.

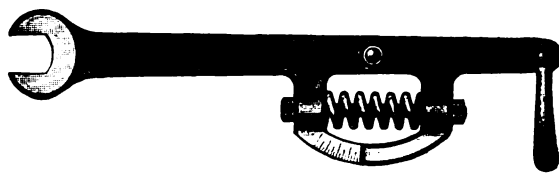


Fig. 5.—Wrench for Producing and Measuring Frictional Adjustment of Rings.

CABLE RAILWAY MACHINERY, BUILT BY THE WALKER MFG. COMPANY, CLEVELAND, OHIO.

quent wear in use, the rings will adjust themselves while the drum is in action, so that there can be no undue strain on any of the wraps of the drums. The rings on which the cable rests move slightly back or forth to suit the irregularities spoken of.

A cable is hauled on the drum under greatly varying loads according to the resistance or number of cars and amount of traffic on the road. From this it will be understood that the cable is wound on the drums tightly or loosely according to the variation of load. While the cable is passing around the drums the tendency is for these to adjust themselves or equalize the strains, which cannot be done on a

the cable in the grooves, transferred to the flat surface of the drum or the underside of the rings. This combined friction of the various loose rings is sufficient, with the leading ring, which is secured, to drive the cable. However, loose side flanges are provided with side studs and a self-registering wrench in order to produce a side friction when necessary. The self-registering wrench will so adjust the studs as to produce an equal amount of friction around the entire circumference of the rings. Each individual ring will move an individual ring with about one-fortieth ($\frac{1}{40}$) of the strength of the cable; the equalizing is thus thoroughly accom-

entire satisfaction. Other plants are being built on which these differential drums will be used.

The New York State Attorney-General, responding to the complaint of Factory Inspector Connolly that manufacturers are neglecting to educate the boys they hire, and that American boys are not being educated to trades in sufficient numbers, is clearly of opinion that a manufacturer can be held legally responsible for neglecting to train a child in mechanics only when that child has been made an apprentice by due forms of law. Otherwise no prosecution would be successful.

The New Burden Horseshoe Machine.

Mr. James A. Burden, president of the Burden Iron Company, of Troy, has just been granted two patents covering his new horseshoe machine, the principal features of which are described by the *Troy Times*:

The result sought to be accomplished by the mechanism shown in these two patents is the production of a finished horseshoe by a series of connected operations performed by a single machine, instead of making the shoe by one machine and finishing it by disconnected and separate operations through the functions of other apparatus. The mechanism illustrated in both the patents alluded to have, in the main, the same function, that of giving to the heated bar from which the shoes are made regular periods of motion and alternating periods of rest. In both constructions, while the bar is moving it is shaped, creased, rough-punched and swaged, and, while at its intermittent periods of rest, it is full-punched by a very ingeniously operating mechanism and is cut off into the required blank lengths. While these two patents provide for the same regular intermittent movement of the heated bar of iron, in one of them the rolls rotate continuously, while in the other the rolls themselves make a half turn as each set of them separately and in continued sequence operates upon the bar to shape, crease and rough-punch its passing blank lengths.

The machines operating the continuously moving rolls have an opposite half of their circular faces upon the latter cut away, so that as the rolls are continuously rotating the opposite halves of the roll faces will engage with the bar to move it a shoe-blank length, and when those parts of each set of rolls where cut away on their circular faces oppositely approach each other in their rotation they will pass over the bar without engaging with it, so that the rolls intermittently engage with the bar to move it a shoe-blank length at each rotation of the rolls. The operation of the shaping rolls in both styles of machines gives the required transversely sectional form to the bar by means of a shaping groove made in one of the rolls, and the plain engaging circular surface of the other of the two shaping rolls. One of the second set of rolls is grooved to receive the bar coming from the shaping rolls, and this groove of the second set of rolls has upwardly projected therefrom blades which press into the bar, at proper distances apart, the creases for the nail holes. From this latter set of rolls the bar passes to the rough-punching rolls, in which one of them is grooved and has punches upwardly projecting from the groove therein, with sinks made in the roller face of the other roll, to come radially opposite the punches as the rolls turn, so that at each rotation of this set of rolls each previously shaped and creased blank-length of the bar is in succession rough-punched for the nail holes at proper distances apart. Thus, as the bar is shaped by one set of rolls, as it is passing through the other two sets of rolls it is successively creased and rough-punched.

The full punching of the previously rough-punched shoe-blank lengths of the bar is accomplished by a very ingenious operation, which is the same in both patents. It will be understood that in doing this full punching the bar is heated, and, being so heated, the tendency is to destroy the punches after a short period of use, as they have to enter the iron and pass out from it, and to be in contact with the heated metal to an extent equal to the thickness of the bar. By Mr. Burden's method the bar as coming from the rough-punching rolls, from the operation of the latter, has nail-head depressions made therein that are conical and elliptically elongated in the direction of the sides of

the bar, which is caused by the entrance and emergence of the radially placed punches, with the metal displaced by the rough punching appearing on the opposite face of the bar as a burr or excrescence; the operation of rough-punching merely putting the nail-holes in a form to be finished punched by a second and connected operation.

While each of the successive blank lengths of the bar enters the full-punching mechanism, and, while the bar is at each of its intermittent periods of rest, the full punches are operated vertically and with great rapidity, to enter the holes previously rough punched, and to as rapidly move away from the bar in return. As the amount of metal to be punched out is very small, the punches are in contact with but little of the heated metal. To further aid the matter there are dies arranged on that face of the bar which is opposite to that at which the punches enter, and these dies have sinks that vertically align with the punches, the edge of the sinks facilitating the operation of the punches in removing the burrs or excrescences formed on the bar from the rough punching.

Mr. Burden, by his entirely new method of punching the blank lengths of the bar, overcomes all of the difficulties encountered by other experimenters, in the fact that in the operation of full-punching the punches have but very little heated metal to come in contact with, and when moving they operate so rapidly there is but little chance of their being injured. To guard against their becoming overheated, as a precaution several sets of punches are arranged so that they can alternately be brought into position. The bar, after these several operations have been completed, passes to the cutting mechanism. From the cutting mechanism the bar passes to the swaging or shaping apparatus, and as soon as the end of the bar has entered the latter, by a rapid movement of the cutting mechanism a proper blank length is cut off and caught by the swaging and shaping apparatus. The swaging or shaping mechanism of the two patents is the same in each of them, and a die wheel having frog-form dies on its circular face is used in both of them. The form of the wheel and its frog-form dies is about the same as in the older machines invented and patented by James A. Burden, although in the two new patents this wheel has a continuous rotation, while in the older machines it was operated with alternating periods of motion and rest.

As this die-wheel rotates, the entering end of the bar is caused when in motion to pass across the face of the revolving die-wheel, and at the same instant the cutting mechanism operates to cut off from the end of the bar one of the previously shaped, creased, rough-punched and full-punched blank lengths, which latter is caught centrally on the toe-end of one of the frog-form dies on the die-wheel, and at the same time as carried around by the latter the bending and swaging levers operate to press the bar in around the frog-form die to give to the blank the requisite form of the shoe. When this has been done another roller provided with sinks, to receive each of the frog-form dies, straightens out and makes laterally true the face of the shoe, so as to remove all buckling or lateral distortion which may have occurred. This straightening out and flattening of the shoe is very ingeniously done by an eccentric face on the sink roller that is made to tangent with the shoe upon the flat base-plate of the frog-form dies, and caused to move with the same speed as the latter by having the gears operating the same, made to differentiate at intervals as to pitch. From the die-wheel the finished shoes are removed as fast as produced and carried away by conveying belts, in the usual manner.

One of the new machines is in process of construction, and some of its parts have been completed. The work will be pushed, and when the new machine is finished its capacity will be tested and other machines will be made and operated at the Burden Iron Works. The new invention will to a great extent revolutionize the manufacture of horseshoes. William E. Hagan was the attorney for Mr. Burden in securing the patent.

This summer a new horseshoe machine was completed by James A. Burden and patented by him. The machine is called the snowshoe machine, because of the style of shoe made by it. Three of these machines are completed and will be in operation in the new building at the Burden iron works in a short time. The capacity of the snowshoe machine is 30 tons of finished shoes a day—24 hours—or 52,000 shoes in round numbers. The aggregate capacity of the three machines will be 90 tons, or 156,000 horseshoes, a day. The machines have been operated in the blacksmith shop pending the completion of the new building, and they fully meet the expectations of the inventor. The new building in which the snowshoe machines are to be operated is practically completed. It is south of the present horseshoe department at the steam mill. The structure is 332 x 62 feet. The brick walls are 18 feet in height, surmounted by an iron truss roof covered with slate. A wing 100 x 60 feet connects the new department with the old horseshoe warehouse. The cost of the new building, with its full complement of machinery—which is partly placed—including a Corliss engine, three horseshoe machines, shearing machines and punching machines, is estimated at \$75,000. The capacity of the Burden Iron Company's works for turning out horseshoes will be greatly increased by the new machines about to be started, and the capacity will be still further increased when the combination machines shall be completed and operated.

Mexican Exports.—According to the *Diario Oficial*, exportations from Mexico to foreign countries during the fiscal year 1887-88 were:

To United States.....	\$31,159,626.66
England.....	10,540,965.23
France.....	4,474,723.31
Germany.....	3,177,106.09
Spain.....	457,842.02
United States of Colombia....	109,956.86
Guatemala.....	34,827.25
Belgium.....	25,583.16
Nicaragua.....	2,500.00
Costa Rica.....	2,107.80
San Salvador.....	490.00
Holland.....	100.00
Italy.....	52.00
Peru.....	25.00

Total.....\$48,885,908.38
Against, in 1886-87.....49,191,950.05

Decrease.....\$306,021.67

Of these exportations the principal ports of Mexico exported—viz.:

Vera Cruz.....	\$16,067,992.84
Paso del Norte (frontier).....	12,022,678.45
Progreso (Yucatan).....	6,468,385.08
Mazatlan.....	4,860,767.51
Laredo (frontier).....	1,215,515.04
Puquian.....	1,004,902.71
Piedras Negras (Eagle Pass).....	874,572.62
Tampico.....	719,789.06
Matamoros.....	441,708.54
Nogales (frontier).....	691,592.95
Ensenada and Tijuana, &c., &c..	116,245.75

The frontier ports show large increase, while nearly all the seaports show large decrease.

A Paterson silk manufacturer failed to deliver a quantity of goods previously contracted for and the defense in court was a strike in the works, which made delivery impossible. Judge Donohue ruled that the strike was not a legal excuse, and this decision was sustained on appeal to the upper court.

Coal Hopper Scale.

An exceedingly convenient and useful apparatus has just been brought out by Messrs. Riehle Brothers, of Philadelphia, Pa., and is shown on this page. It is known as the Drexel Coal Hopper Scale.

The scale has an iron or wooden hopper on it and is so arranged that it can be placed under the pavement or floor, and will accurately weigh the coal that is dumped into the hopper from the wagon or cart. The hopper can be made large enough to carry one, two, three or more tons of coal, and the scale is strong enough to allow the coal to remain on it until it is used. At the bottom of the hopper is a sliding draw plate, which can be opened by the engineer and the coal dropped into

houses where a great deal of coal is consumed, a scale of this kind will be found desirable.

Recent Treasury Decisions.

RAZOR BLANKS DUTIABLE AS RAZORS.

The appellants claimed 2½ cents per pound, or as manufactures of steel at 45 per cent. ad valorem, instead of 50 per cent. assessed. From the special reports of the appraiser on these appeals it appears that the articles in question are razors with blades of regular patterns and with finished handles, and that with the exception of grinding and polishing, they are ready for use. It appears, further, that similar articles were imported in 1886, and were classified as "razors," and that action was

that they were not handled, and which were ascertained to be commercially known as cutlery, were held to be dutiable as cutlery. Department's prior decision, however, of 1873, under which duty was assessed in this case, holds that certain pocket-knife blades are dutiable as manufactures of steel not otherwise provided for, and not as penknives, jackknives or pocket-knives.

It was submitted whether, in view of the appraiser's report and the principles enunciated, these goods are not dutiable as claimed by the appraiser. This would be on the theory that as these blades are known as cutlery, and as pocket-knives are also known as cutlery, therefore, these blades should be assessed with duty at the rate specially provided for pocket-knives. In the opinion of the Department, this conclusion can hardly be accepted, inasmuch as the provisions would not seem to cover articles such as these, which are only parts of pocket-knives which are commercially known and designated as cutlery. Being commercially known as cutlery they are clearly covered by the special provision therefor, as claimed by the appellants.

DUTY ON THUMB TACKS.

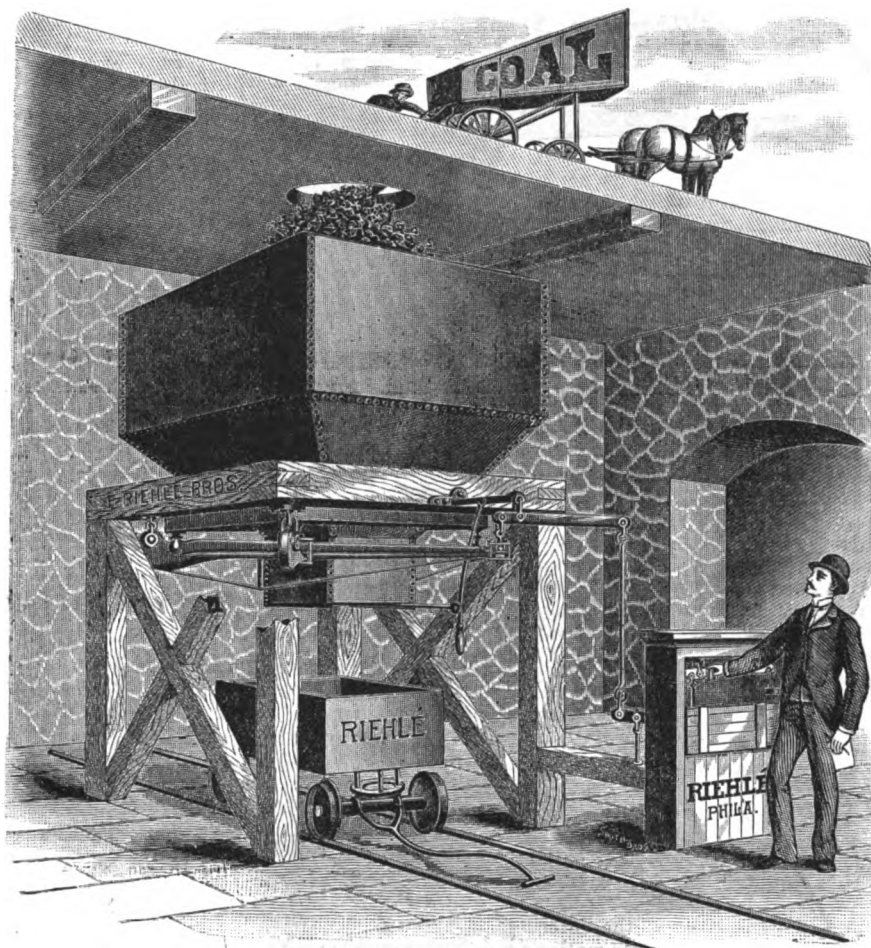
Parties having appealed from an assessment of 45 per cent. duty, claiming 2½ cents per pound for cut tacks, the Secretary, affirming the assessment, says: "From the special report of the appraiser submitted it appears that the articles in question consist of thumb-tacks put up in boxes of one-half gross each, with a small steel instrument for pulling up the tacks after being used, and the United States Appraiser at New York, to whom the question was submitted, states that the articles are commercially known as thumb-tacks, which are generally used by artists and others to fasten, by the pressure of the thumb, the drawing paper or other material to a drawing board, and that it is his practice to classify them in accordance with the return made."

The Connellsville Coke Trade.

From present indications there will be no advance in the price of coke during the present month. The question of advancing the price to \$1.50 per ton, to take effect on the 1st inst., was thoroughly discussed by the leading operators, but it was decided that at present such a move would not be advisable. It is the general impression that the price will be advanced to \$1.50 per ton after January 1 next. The production of coke for the month just closed was the largest for the same period in the history of the Connellsville region. The estimated production for the week ending on the 24th ult. was 125,090 tons, and that for the previous week was 125,595 tons. Of the 13,955 ovens in the region 12,250 are in blast.

Within the last few weeks there have been published in the Pittsburgh papers a large number of rumors of coke deals, which, upon investigation, were found to be without truth whatever. The latest of these appeared last week and was to the effect that the McClure Coke Company and the H. C. Frick Coke Company had decided to consolidate their interests, for the purpose of waging war on the smaller operators, with the ultimate intention of driving them out of the business. We are authorized to state that there is no truth in the rumor whatever.

The Detroit Copper and Brass Rolling Mills, at Detroit, Mich., report to us that last week the works turned out the two largest sheets of copper ever rolled in this country. They were ¼ inch thick and 11½ feet square, weighing 3000 pounds each when finished.



COAL HOPPER SCALE, MADE BY MESSRS. RIEHLE BROS., PHILADELPHIA, PA.

an iron car or wheelbarrow and carried to any place desired, whether to a storing bin or direct to boiler. Thus all the coal is received, weighed and moved without any handling, and, as will be readily seen, the device is excellent for guarding against incorrect or careless weighing, and for the economical distribution of coal to the places desired. The scales are made specially strong and accurate, and the levers and weighing parts all regulated to the standard of the United States, so that no dispute can occur upon that point. In case the accuracy of the scales may be questioned, the United States standard weights can be placed upon them and tested. A scale of this kind was placed in the new Hood, Bronbright & Co. building, Eleventh and Market streets, Philadelphia, some time ago, and its value and importance so well proven that one has been located in the new Drexel building, Fifth and Chestnut streets, Philadelphia. For public institutions and large ware-

affirmed by the Department. The decision assessing duty at 45 per cent. ad valorem on the merchandise covered by the present appeals is, therefore, hereby affirmed.

DUTY ON POCKET-KNIFE BLADES.

The appellants claim that pocket blades are dutiable as "cutlery" at the rate of 35 per cent. ad valorem, instead of 45 per cent. ad valorem. The appraiser reports that the merchandise consists of pocket-knife blades fully finished and ready for hafting. He further states that such articles have been commercially known and designated as "cutlery" from the date of their first manufacture, but that being complete pocket-knives, except that they are not handled, they would (but for the decision above cited), be returned for duty under the special provision for pocket-knives at the rate of 50 per cent. ad valorem.

By said decision certain table-knives and forks which were complete, except

Improved Saw Mill.

The Salem Iron Works, of Salem, N. C., are putting on the market an improved saw mill for small power, having been specially designed for farmers—for example, who have a small water or steam power, but do not care to invest in an expensive mill. It is not intended for doing a large lumbering business, or for sawing long and large logs, but for those who want a good, cheap mill for their own use and do not care to saw logs over 8 feet in diameter or 16 feet in length.

The saw frame is made of seasoned long-leaf pine, 4 inches thick by 12 inches deep, well tenoned and bolted together, and is 8 feet wide and 6½ feet long. It has a mandrel 2½ inches diameter by 4½ feet long. The cone pulley gives three changes of feed, ½, ¾ and 1 inch to each revolution of the saw, as may be required to suit the power. The carriage is 37 inches wide and 18 feet long, also made of seasoned long-leaf pine, tenoned and bolted together, having four cross pieces in each 18 feet of carriage. The timber is 4½ inches thick and 6½ inches deep. The head blocks are 3½ feet long. The knees are 19 inches high and open 30 inches from saw. The head blocks and knees weigh about 150 pounds each. The mill will carry any size saw up to 48 inches diameter, and a 6 to 10 horse-power engine and boiler will furnish enough power to do a reasonable amount of sawing.

Each mill is provided with an improved double eccentric friction feed, adjustable mandrel boxes, wedge wheel, long rest, saw guide, and enough improved conical rollers and boxes to go on ways twice the length of carriage.

Dynamite Shells.

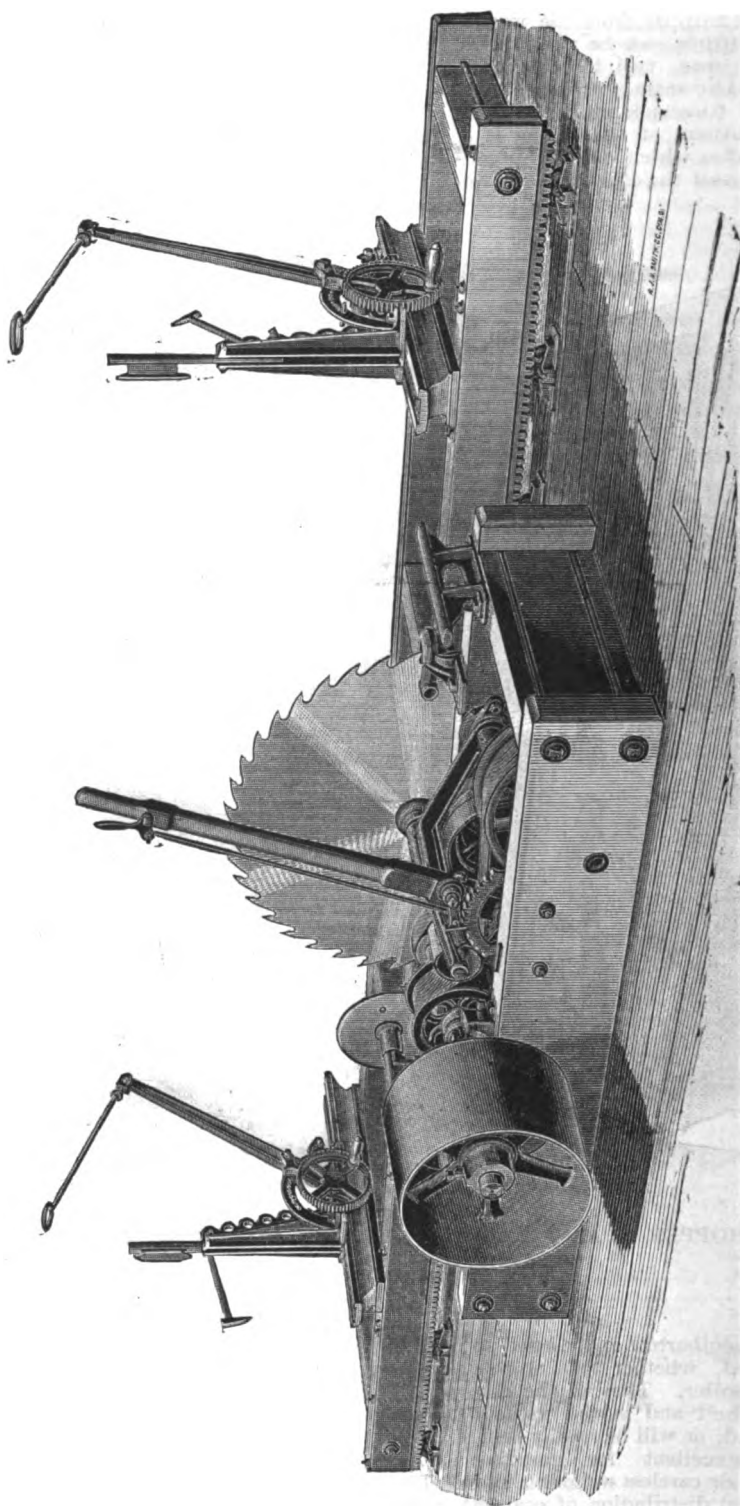
In view of the increasing attention which is given to the problem of throwing shells filled with high explosives, the results which have been obtained in this country by Lieut. James W. Graydon, late of the United States Navy, are of considerable interest. Though we have on a previous occasion referred briefly to Lieutenant Graydon's shell, we will here repeat that it is charged with dynamite and is fired out of service guns with ordinary powder. It is well known that dynamite may be exploded by a sudden concussion, and that, if it be substituted for the ordinary powder in a shell, there is a great chance of the gun being blown to pieces before the projectile can leave the muzzle. Lieutenant Graydon eludes this disposition of dynamite to explode prematurely by dividing the charge into a large number of small packets or pellets, each inclosed in an envelope of impermeable material. To still further isolate the contents of the packets, the interior of the shell is lined with a non-conducting substance, such as asbestos, and is divided into compartments by partitions. The result of the arrangement is that the nitroglycerine cannot separate from the solid matter with which it is associated, or become more concentrated in one part of it than in another; the shock of the propelling charge is also modified before it reaches the explosive, the envelopes constituting an elastic cushion which softens the blow.

The shell is provided with a percussion fuze, but to delay the explosion until the projectile has penetrated deeply into the object, against which it is aimed, the striker is seated upon a stiff spring of some length. This spring has to be fully compressed before the percussion powder is ignited, thus affording a minute fraction of time between the impact and the explosion. In this brief interval the shell can bury itself more or less deeply, bring-

ing its disruptive action to bear within the actual substance of the target. From experiments made by officers of the United States army and navy, it would appear that the method of filling shells is perfectly effectual, at least we read of no failures in the reports rendered by them to their Government. The plan is certainly simplicity itself, and, while it guards the dynamite against premature explosion,

be used with perfect safety in any gun in the service, and they all joined in recommending further experiments with the 8-inch rifle and the 15-inch smooth-bore gun.

Later trials made with a 7-inch rifle gave further highly satisfactory results. One European nation, at least, has decided that the Graydon shell is a very valuable invention. The French Government have



IMPROVED SAW MILL, BUILT BY THE SALEM IRON WORKS, SALEM, N. C.

does not seem to reduce its shattering action when it is ignited by the fuze. Three sets of trials have been made of the Graydon shells by or in the presence of United States officers. They reported that, in their opinion, Lieutenant Graydon's claim to have invented a process of so charging a shell with dynamite that it can be fired from a gun in service, with the service charge of powder, had been fully demonstrated as far as the 4½-inch gun was concerned. Two of the officers were convinced that the invention could

purchased the patent rights for their own country for the sum of \$500,000.

It is stated that the management of the Delaware, Lackawanna and Western have decided to cease using 42-inch paper wheels under their passenger equipment, and adopt the 36-inch wheel as their standard. The reason assigned is that with the 42-inch wheels they experience a good deal of trouble from the springing of axles. Their passenger car-wheels in the future will be steel tired.

An Experimental Engine for Technical Schools.

In the course of an extensive article on the Central Institution of the city and Guilds of London Technical Institute, *Engineering* describes and illustrates the experimental steam engine used in the engineering department. It appears from this that the following conditions to be fulfilled were laid down by Prof. W. C. Unwin, the director, in applying for tenders:

1. The engine must be capable of being worked as a compound expansive engine, the steam being condensed in a surface condenser.
2. Either cylinder or both cylinders together must be capable of being used as a non-condensing expansion engine.
3. With one cylinder working and without condensing it must indicate 30 indicated horse-power, with a boiler pressure of 60 pounds per square inch.
4. The steam must at will be admitted to or stopped off from the jackets of either cylinder. The condensed steam from the jackets must drain to a point where it can be drawn off for measurement.
5. The cut-off in each cylinder must be capable of being varied by hand from 20 per cent. to 60 per cent. of the stroke at least.
6. The clearance of the ends of the cylinders should be capable of being varied.
7. The intermediate reservoir between the cylinders should be as small as possible, but capable of being enlarged by a volume equal to twice the volume of the high-pressure cylinder.
8. The governor must be arranged to act on a throttle valve on the main steam-pipe. If it could also be arranged to act on an automatic cut-off to one of the cylinders it would be advantageous. Of course, when acting on the valve gear the throttle valve would be set wide open.
9. The cranks of the two cylinders must be capable of being set at right angles at 180°, and at least two other relative positions.
10. The condenser must be arranged to drain the cylinder, and the condenser and air pump must be so placed that the discharge of condensing water and of condensed steam can be delivered above the floor so as to be conveniently measured. It is very important that there should be no leakage of condensing water into the steam space of the condenser.
11. Indicator cocks are to be fitted to each end of each cylinder, and separate gear for working the indicator is to be provided for each engine. Provision to be made for attaching an indicator to the air and circulating pumps and to the intermediate steam reservoir.

The design and tender of Messrs. Marshall, Sons & Co., Limited, of Gainsborough, was finally accepted. The arrangement adopted was that of two ordinary horizontal engines placed side by side and working the same crankshaft. The high-pressure cylinder is 8½ inches in diameter, and the low-pressure 14 inches in diameter, the stroke in each case being 21 inches. With the exception of the front covers, the cylinders have jackets all over which drain through a steam trap into a graduated tank below the floor level. Each end of each cylinder has a vertical port, which is closed by a blank flange when the engine is at work. The flange is cast with a flat plate which more or less completely fills up the port. A number of these flanges with displacing plates of different dimensions are provided so that the clearance of the engine can be varied within somewhat wide limits. Steam can be shut off from either cylinder at will, and either engine worked independently by uncoupling the connecting and eccentric rods of the other. The governing of

the engine is effected by an automatic expansion gear, in the case of the high-pressure cylinder, and by a throttle-valve in the case of the low-pressure. The throttle-valve is of the Cornish equilibrium type, fitted in the same casting as the steam stop-valve to the low-pressure cylinder. In order to be in a position to make experiments on the effect of varying the angle between the cranks, the crankshaft has been made in halves, which are connected together by a flanged sleeve. The coupling on the high-pressure side is made with six bolts, and on the low-pressure by seven, so that the cranks can be placed at 42 different angles. A rope-driving pulley has been fitted on this sleeve. In the design of the surface-condenser every precaution has been taken with the object of making it absolutely steam-tight. This point is of the utmost importance for scientific purposes, as a comparatively slight leakage may seriously affect the correct interpretation of the indicator diagrams. The circulating water enters the condenser at the top, flows down the central pipes, and up through the spaces between the inner and outer tubes, and is finally discharged into a measuring tank. The steam, of course, flows round the outer tubes. As all the joints between the tubes and the tube-plates can in this design be made by expanding the tubes, perfect tightness is secured. The air-pump discharges into a calibrated tank, and when this is full the discharge can be turned into another similar tank, while the first is emptied by opening a valve. The discharge from the circulating pump passes into another tank, and thence through a series of baffle-plates of wire gauze out through a carefully calibrated orifice, the head over which is measured by the reading of a scale carried by a float in the tank. The advantage of this method over the plan of discharging over a weir is that small errors in the determination of the head over the orifice do not affect the result to so great a degree. All these tanks are supported on the wooden stand, and each is fitted with an accurate thermometer.

The brake dynamometer is of the internally cooled type, the distinctive feature of which is that the brake-wheel rim is made trough-shaped, and into this trough a constant supply of water is introduced on one side of the wheel and skimmed off by another pipe on the other side of the wheel as it gets hot. It is intended to take 50 horse-power, but could probably absorb considerably more. The compensated gear is fitted with a spring balance, and allowance is made for the reading of this in estimating the brake horse-power. The break shaft is driven by a link from the low-pressure crank-pin, and can be entirely disconnected from the engine when not in use. The engine can be worked, as (1) compound condensing; (2) compound and non-condensing; (3) high-pressure engine only and non-condensing; (4) both engines with high-pressure steam and non-condensing; (5) low-pressure engine only and non-condensing; (6) low-pressure engine only and non-condensing.

Lean & Blair, of Pittsburgh, inform us that they have closed a contract with the Union Rolling Mill Company, of Cleveland, Ohio, for the remodeling of their blast-furnace plant, including the erection of two of their Ford & Moncur hot-blast stoves. These two stoves are to blow a furnace of 200 tons daily capacity, and it is claimed that the blast for two of the largest modern blast furnaces can easily be heated with three of these stoves, and kept at an absolutely even temperature throughout the blow, and the stoves kept perfectly clean for all time. If these claims, which are backed up by letters from many of the most prominent British iron masters who have these stoves in use,

can be substantiated, a most valuable step in the right direction has undoubtedly been made. We hope to give our readers further information on this point before long, after these stoves and those now in course of erection at Talladega, Ala., have been blown in.

Southern Pig Iron Freights.—The Queen and Crescent route via the Alabama, Great Southern and the Cincinnati Southern Railway have issued a new pig iron tariff which went into effect on the 1st of December. It shows a reduction of 20 cents a ton. The rate to Chicago is \$3.70 from Dayton and Rockwood, \$3.90 from Chattanooga, \$4.15 from Rising Fawn, Attalla, Bessemer, Birmingham, Gadsden and Wheeling, Ala.; \$3.90 from Florence and Sheffield, \$4.40 from Anniston, Clifton, Ironaton and Jenifer, Ala. To Cleveland the rates are 25 cents less than these. To Cincinnati the figures are: From Dayton and Rockwood, \$2.20; Chattanooga, \$2.40; Rising Fawn, \$2.65; Attalla, Bessemer, Birmingham and Wheeling, Ala., \$2.90, and Florence and Sheffield, \$2.65. The Kansas City rate is \$5.78 from Dayton and Rockwood and \$5.98 from the other furnaces. The St. Louis rates are \$2.95 from Rockwood and Dayton, and \$3.15 from Chattanooga, and \$3.40 for the Birmingham district.

A Buffalo man claims to have solved the problem of "harnessing" the Niagara River, for which Buffalo business men have offered a reward of \$100,000. A model of the invention exhibited in the Board of Trade shows two massive piers on each bank of the river. Heavy shafts stand up obliquely by the piers. At the bottom of the shafts an endless belt runs from shaft to shaft across the river, made of two strands of 2-inch cable. Fitted to this cable every 5 or 6 feet are sheet-iron plates, 3 x 5 feet, pivoted at one end, opening either way, but chained so that they open but a short distance. The full force of the current pressing on these plates forces the belt around at a great rate, and by ingenious arrangements the current is felt equally both going and coming. The shafts revolving drive a cable and furnish power on the banks. The inventor, Mr. Edward Suckrow, figures that 16,000 horse-power can be secured in this way.

Joseph Colby, of Milwaukee, has been elected treasurer of the Penokee and Gogebic Development Company, which owns the famous Colby mine, as also the Ashland and Tilden, on the Gogebic range. When the Colby mine was opened three years ago it was leased to Mather, Morse & Co., of Cleveland, for three years. The lease expired November 1, and the Development Company will now work it themselves. Pickands, Mather & Co. will handle the ore. Mr. Colby said in a recent interview that there had been about 750,000 tons of ore taken from the Colby, and that this amount had been taken from an area of about 20 acres. Capt. William Dickinson, an experienced mining man, has taken the superintendency of the Colby. The lessees of the mine, Mather, Morse & Co., left the mine in good working order, and work will be commenced without any delay. Mr. Colby says that there are a number of other properties on the Gogebic range that were closed when the collapse came that it will pay to invest money in, as soon as they can be gotten out from under the present burdens of litigation.

The first cotton mill erected in Iowa was put in operation at Des Moines on the 26th ult., with interesting ceremonies. The factory has a daily capacity of 10,000 yards.

Compressed Air for Power Transmission.

Prof. W. C. Unwin recently contributed to the transactions of the British Institute of Civil Engineers a paper on conveying power by compressed air, with the aim of stating in a simple form the laws governing such power transmission. From it we quote as follows:

In examining some of the calculations on which schemes for using compressed air have been based it appeared that they were unnecessarily tentative and cumbrous. In one not unimportant respect calculations about the transmission of power by air appeared to be based on a wrong principle. By analogy with the transmission of power by water it has been tacitly assumed that the frictional work in the mains is entirely wasted work. But with air it is not so. Under practically realizable conditions the whole of the frictional work in the mains may be expended in heating and expanding the air. What the air loses in pressure it gains in volume. The fall of pressure does involve a loss in transmission, because the efficiency of the pump or of the motor is affected. But in spite of this secondary loss an advantage remains to the air, and part of the frictional work is recovered.

After many years of experience the system of hydraulic transmission has been carried to a high degree of perfection, and the conditions of success are well understood. To transmit power economically and efficiently by water a very high pressure must be adopted, and a moderate velocity in the mains. That moderate velocity in the mains is dictated not only by considerations of friction, but also more imperatively by the necessity of limiting the stresses due to the inertia of the incompressible mass of water in the mains when the velocity changes. The whole mass of water in the mains must change velocity simultaneously, and hence the shocks due to sudden changes of velocity are very serious. Now both the high pressure and the low velocity limit the size of mains which can be used, and therefore the amount of power which can be transmitted.

Systems for transmitting power by compressed air are not as yet so completely worked out, nor are the conditions of economy and efficiency so well understood. The unavoidable heating losses in compression limit the pressures which can be used in air transmission, and it is doubtful if in any case efficiencies quite so great as those attained with water can be realized with air. Nevertheless there are cases where the moderate pressures used in air transmission are far more convenient than the high pressures required for water transmission, and there appears to be no definite limit to the size of the main which can be used, or the amount of power which can be transmitted, if necessary, by air. For three reasons the velocity of flow in the mains may be very much greater with air than with water. The friction in the mains is less with air than with water in the ratio of their densities. The frictional work is less an evil with air than with water, because part of that frictional work is recoverable. Lastly, the elasticity and small density of the air makes the danger of shocks or inertia stresses to practically vanish. Water can only afford work less than the product of its pressure and volume, but air used expansively gives an amount of work greater than the product of its pressure and volume. Hence it turns out that with a given size of main a considerably greater amount of power can be transmitted with air of moderate pressure than with water of very great pressure.

As the air flows along the main the resistance of the surface of the main has to be overcome and the pressure falls. In

correspondence with this the volume of the air and its velocity increases, and it is necessary to know the law of expansion. The work expended in friction in the pipe generates heat, and if all this heat is retained in the air then the expansion would be exactly isothermal. Thus, in a perfectly non-conducting main the temperature must remain constant, however rough the main and however great the fall of pressure due to frictional resistance. Actual mains are not non-conducting, and, no doubt, if air entered the main at a higher temperature than the surrounding soil, some heat must be lost by conduction. If, however, as has been assumed, the air enters the main at 60°, which may be taken to be practically the temperature of the soil, no heat can be lost by conduction. The main is for air at that temperature incapable of conducting away heat, and the expansion in the main must be isothermal.

It follows from this that there is an essential difference between the transmission of power by water and the transmission by air. In the former case the frictional work in the main is wasted and lost. The heat produced in the water does in no way add to the effective work of the motor driven by the water. But with air the heat generated expands the air, and the air does more work in the motor in consequence of its expansion. However long or rough the main the energy of the air per pound remains constant. To the extent to which the pressure falls the air may be less serviceable in doing work in actual motors. But this does not destroy the advantage of air in transmission, though it may reduce it.

The project of a trip of the American engineering societies for a joint visit to Europe is beginning to take tangible form. E. N. Carbutt, president of the Institution of Mechanical Engineers, of London, has tendered an invitation to the American Society of Mechanical Engineers, and the latter have now issued a preliminary circular asking members of the three societies, the Civil, Mechanical and Mining Engineers, to inform the committee, W. R. Hutton and W. R. Wiley, whether they can attend.

The Chicago, Rock Island and Pacific Railway have issued a circular calling the attention of shippers to the completion into Colorado of the lines of their Western extension, the Chicago, Kansas and Nebraska Railway. A new route has been formed to Denver, Colorado Springs and Pueblo from Chicago, without transfer. A fast through freight service has already been inaugurated, while the passenger facilities provided over the new line are of the very best character. A New Joint Through Freight Tariff, comprising a pamphlet of 121 pages, which took effect on November 10, has just been issued. This tariff, besides showing through rates to the West from Chicago, presents a basis upon which through rates may be figured from points on the Atlantic seaboard and also from the manufacturing centers in Indiana, Michigan and Ohio, as well as other sections of the Middle and Western States. Freight from the East is delivered to the company at Chicago, outside the city limits, thus avoiding the delays and annoyances from the transfer of freight through the crowded Chicago yards.

In a recent article entitled "Dynamical Terminology," commenting on the rapid multiplication of new dynamical units, such as the "kine," the "bole," and the "barad," the London *Engineer* very appropriately says: "The world has for some time been acquainted with the erg, the velo, the cello, and other words of cognate

import. We may say, for the benefit of our younger readers, that engineers never use these words; but it does not follow, therefore, that they are useless or inappropriate. In the first place, certain minds find an innocent pleasure in inventing such terms, and it is so seldom that we find the physicist inventing anything that we should be slow to step in and try to put a check on his efforts. Indeed, we should not criticise boles, barads, and ergs, in any way, were it not that time may unfortunately be spent to little purpose by engineer students in learning how to use them, and the student has so much of importance and value to learn that every hour is an object."

The question whether the pressure of a saturated vapor is the same in a vacuum as in the presence of a gas is still a disputed one. Regnault attributed the differences observed by him to secondary causes, such as the deposition of condensed vapor on the walls of the containing vessel. Mr. F. Braun describes a series of careful experiments on sulphurous anhydride, from the results of which he arrives at the conclusion that the pressure of this vapor at the temperature of condensation is diminished by at least 3.0 mm. of mercury by the addition of an equal volume of carbonic anhydride at the same pressure and temperature, and by 1.8 mm. by the addition of an equal volume of nitrogen under similar circumstances. He infers in general that the pressure of a saturated vapor is not the same in the presence of a gas as in a vacuum, even when all disturbing causes are absent. The question is of importance in relation to the dissociation of gases, and up to the present it has not been found possible to decide it on theoretical grounds.

The December stock sheet of Joseph T. Ryerson & Son, of Chicago, contains some special features in connection with steel plates which are worthy of notice. Inasmuch as many boiler-makers use for flanging purposes any steel that they find capable of standing flanging tests, even though it was put on the market as tank steel, this firm have determined to make an effort to fix a standard of quality under which flanging steel may be sold with a full knowledge of its character. They have, therefore, had their Juniata flange steel made to conform to the United States Government requirements for marine boilers. Plates from the mill will be furnished when wanted, with coupons or test pieces attached for testing. This new departure will be appreciated by a large class of boiler-makers as well as boiler users. The stock sheet just issued contains a large addition of odd sizes not frequently carried in stock by plate merchants.

The Stonefield and Factory Iron Works, Bilston, Staffordshire, England, the property of the executors of the late Joseph Sankey, and for upward of a quarter of a century carried on by the Bilston Iron Company, have been leased to William Molineaux, who will carry them on in conjunction with Edward Jordan, and will trade under the old style of the Bilston Iron Company. The new firm have also purchased the good will and brand of the old firm, and will immediately put the works in operation, and continue to supply the White Swan brand of sheet iron. The works stand on about eight acres, and comprise five sheet mills, 17 puddling furnaces, and all the necessary plant for the manufacture of galvanizing, working up and other sheets. A steam hammer will at once be put in, and a railway siding is being arranged for. The negotiations have been conducted by Mr. John E. Perry, of Wolverhampton, England.

THE WEEK.

The new building for the Progress Club, to be erected on Fifth avenue and Sixty-third street will cost \$500,000. The architectural plans are those of Alfred Zucker & Co. The material used in the *façade* will be fawn-colored brick, terracotta and gray rock, with ornamental iron-work for balcony, railings and window guards.

A trades school for colored boys is about to be established in Philadelphia under the auspices of the Institute for Colored Youth, which has about 300 pupils. A large three-story brick building will be erected and fitted up with all necessary tools and appliances.

President Diaz, newly elected as chief executive of the Mexican Republic, has entered upon a new term of official existence, and important results from the standpoint of trade and industrial enterprise are predicted for his administration. He proposes to carry forward to a successful issue two great undertakings—one, the drainage of the valley of Mexico, and the other the building of a railway line to connect the national capital with the rich State of Oaxaca. Together, these projects are expected to absorb some \$40,000,000, and, as the President and General Pacheco, the Minister of Public Works, are both exceedingly friendly to citizens of the United States, contractors outside of the Mexican republic will watch developments with special interest.

By the decision of the Court of Appeals at Albany Cornell University is deprived of \$1,500,000 willed to it by Jennie McGraw-Fiske, wife of Professor Fiske and heiress of the McGraw estate. The decision is based on the fact that Cornell University was limited by its charter to property possessions not exceeding \$3,000,000, and that it had that amount before the bequest of Mrs. Fiske. The decision does not determine the future distribution of the money.

It is reported in Chicago that an agreement has been made by representatives of Western and Southwestern roads to form a railroad clearing house, which is another name for a "trust." It is believed, however, that the trust or clearing-house plan is in conflict with the Interstate law, as it is nothing more or less than a pooling of all the railroad interests in the West.

The Common Council of Reading, Pa., has passed an ordinance making it unlawful for any contractor on public works, such as sewers, reservoirs, public buildings and the like to employ any but citizens of the United States. It is said that the ordinance emanates from labor organizations in Reading, and that it is part of a concerted effort to be made in all the leading cities to put a stop to the importation of foreign contract labor.

The old material of the Great Eastern realized \$290,000, thus disproving the old maxim that a live jackass is worth more than a dead lion.

A powerful new labor organization, to deal with political questions, is said to be in course of formation in Pittsburgh, under the lead of John Jarrett, Charles Litchman and others who do not precisely agree with the methods of Mr. Powderly. Thomas Barry, ex-K. of L., has still another scheme in embryo.

The Emperor of Brazil is contemplating large railway projects and offers valuable concessions to any syndicate prepared to enter into engagements for construction.

The jute bagging trust is said to be falling to pieces, owing to the shrinkage in sales. There are, in all, 24 bagging factor-

ies in the United States, and of these 16 are shut down, having been leased by the "combine" and closed to lessen the production and to stiffen prices. The first day of January these leases expire, and the 16 factories are ready to start up again unless once more leased by the trust, for which thus far there has been no arrangement made.

The new court house at Evansville, Ind., just commenced, will be a thoroughly fire-proof structure, costing \$500,000.

Commercial travelers are endeavoring to have the Interstate Law amended so as to permit concessions by railroad companies in favor of recognized merchant drummers.

Pittsburgh glass manufacturers have received an order for 1000 boxes of lamp chimneys for China, equal to 6000 dozen.

Commodore Walker, Chief of the Bureau of Navigation, says: "It is a matter of national satisfaction that it has fallen to the United States to take the initial steps which it may be confidently hoped will lead to a codification of the rules of navigation, and thereby promote immeasurably the safety of ships at sea."

It is stated from Washington that there is a great deal of influence being exerted to bring about a special session of Congress to authorize the admission of the Territories as States, and to begin the work of tariff revision.

The street railway service in the city of Mexico is to be done by American locomotives similar to those on the New York elevated roads.

A Bradford, Pa., correspondent makes the statement that the great oil fields of that State are being rapidly and surely exhausted. Hundreds of wells are being drilled, with indifferent success. The writer says: "If none of the 500 wells now drilling find a rich spot, the Ohio fields must become the center of the great petroleum industry, and Ohio oil is pretty sure to take its place as an illuminant as well as the fuel of the future. The Ohio field exceeds in area any field yet found in the world, and its possible daily yield is placed by practical men as high as 100,000 barrels a day. The work of removing the monster iron tanks from the Pennsylvania fields into the Lima district still goes on. A dozen crews of men are at work every day cutting down the empty tankage in the Bradford district, all of it being intended for Ohio. The amount of oil now held in iron tanks in the Ohio field exceeds 9,000,000 barrels."

Russia for some months past has been attempting to effect a national loan in the European markets, without success, the object being ostensibly to prosecute railway enterprises and systems of internal improvement, but her ultimate purpose is believed to be to push her territorial claims in the direction of India. A prominent New York broker is reported as saying that the Rothschilds had first been offered the loan or any part of it, but the offer was promptly declined, and overtures to two well-known English houses resulted in like manner. "Something was then decided upon," the account runs, "which was decidedly out of the usual run of financial operations. The New York banker received a letter from his correspondent in Berlin, telling him of the difficulties experienced by the Russians in the European money markets, and asking him if he thought he could do anything with the bonds in this country. He at once returned word that there was no hope of such a thing. Then he explained why there was not. He said it was true that money was very low in this country, and that there was plenty of it, but that the peculiarity of the American investor was

that he wanted to see something tangible in which he was to invest. There were plenty of chances in the American markets for investments—chances, too, where the element of risk was reduced to the minimum, and it was in such, and such alone, that American money would find its natural outlet. Unless the rate of interest on the Russian bonds was equivalent to 7 per cent., and based upon some surer foundation than other loans to that Government had been, there was no chance of raising \$1,000,000 in the United States. A reply to this letter was that the highest proposed rate of interest was 5 per cent. Thereupon negotiations were declared closed." The prediction is made in Wall street that within three months Russian bonds bearing interest of 7 and 8 per cent. will be offered in the money markets of the world, with no takers, and that the country will find itself in a very perplexing situation.

The fact that the leaves of pine trees can be manufactured into bagging, and compete successfully with jute for baling cotton, is information of inestimable value to all who are engaged in cotton growing in the South. There are other uses also for which pine leaves may be used, such as the manufacture of paper pulp, pine wool for stuffing mattresses and pillows, quilts, upholstering furniture and a hundred other things unthought of at present.

A number of the Southside glass manufacturers in Pittsburgh are in revolt against the alleged extortionate prices of natural gas, and are combining to establish an independent gas company to make their own fuel. Manufacturers who paid \$700 a month last year now have to pay \$900, \$1000 or even more than that per month in some cases.

The Commissioner of Internal Revenue has made an elaborate report, showing that the total receipts for the fiscal year were \$124,326,475, an increase of \$5,489,174 over the receipts of any year since 1883, when the receipts aggregated \$144,553,345. The receipts for the year were also \$4,326,475 more than the estimate. The estimated receipts for the current fiscal year are \$125,000,000, provided no changes are made in the existing rates of taxation. The cost of collection of internal taxes for the year was \$3,978,288, being less than 3.2 per cent. of the amount collected.

The scourge was driven out of Jacksonville by Jack Frost, after 408 persons died. There were 4677 cases of fever.

Among new industrial enterprises in the South reported last week is a \$5,000,000 company composed of New England capitalists, organized at Fort Payne, Ala., to develop mineral land, build furnaces, a rolling mill, &c.

The Gansevoort Market Building, in this city, which cost \$477,000, will be formally opened 17th inst. It is pronounced the finest structure of its kind in the United States. The location is on West street and Thirteenth avenue. A portion of the west-side wholesale trade is expected to follow the market building.

The season of navigation on the Erie Canal has proved well-nigh disastrous, chiefly on account of railroad competition, for notwithstanding about 40,000,000 bushels of grain were transported by the water route, surpassing the total of 1886, the average freights have been so low that few boatmen have realized any profit. "Even when we were taking oats at 1½ cents to New York," said a leading boat owner, "the roads cut under that ruinous rate and took the grain away from us. They must have carried oats for about 1 cent a bushel, and that, too, when no one was in a hurry to get grain to the seaboard. I have never seen the roads fight us the

season through as they have done this year. Here is a point that the friends of the canal should ponder well. Do they suppose that the roads were willing to run a car through to New York for less than \$10 from a spirit of mere day-by-day competition? Was it not rather a part of a deep-seated policy, never quite lost sight of, to beat out and ruin the canal interest in the end?" It was stated within a week from the time the canal shipping season closed that the roads were already getting 11 and 13 cents a bushel on corn and wheat respectively from Buffalo to New York. "If the roads keep on fighting us like this," said the boatman quoted above, "it is only a question of time when our property will be rendered worthless and our business gone."

The line of American steamships plying between New York and ports in Venezuela has had uninterrupted prosperity, and now comprises a fleet of the first class. The owners, Boulton, Bliss & Dallett, coffee importers, have just placed another contract for a steamer of about 3000 tons with the Cramps, of Philadelphia, making the third contract of this character within the last six months, together representing an additional investment of nearly \$1,000,000.

About 3000 men are at work completing the Poughkeepsie bridge and its connections.

It is proposed to remove the New York Mercantile Library from Clinton Hall, Astor Place, where it has been located for 30 years, to a site at Broadway and Thirty-seventh street.

The Mexican Southern Railway, to extend from Puebla to the State of Oaxaca, will open a tropical region of great fertility, and, aside from local advantages, will shorten by five or six days the time from New York to Lima, Valparaiso and other points on the West Coast of South America.

The extent to which the foreign trade of New York is being monopolized by British vessels appears from the fact that of a total of 322 arrivals at this port during November 187 were British. In all classes of vessels, excepting steamships, there is a falling off.

The most important points in the reports from the several Territorial Governors, as bearing on their prospective admission as States, relate to population, which is estimated as follows: Alaska, 49,850; Arizona, 83,000; Dakota, 600,000; Idaho, 100,000; Montana, 140,000; New Mexico, 175,000; Utah, 210,000; Washington, 167,982, and Wyoming, 85,000.

The gross damages to be paid by the elevated railway companies on account of injury to property on the line of their roads in this city is estimated at \$12,000,000, in case the recent awards by Commissioners appointed to adjust claims of owners serve as a precedent for future decisions.

The second step in the commercial conquest of Zanzibar is a joint blockade of the coast by the English and German fleets.

An experimental paper stock mill at St. Louis has demonstrated that the waste or refuse lint of mills that make cotton-seed oil is almost as valuable as the oil itself, this substance being convertible into paper. The receipts of the cotton-seed oil mills, it is said, will be almost doubled from that source, while expenses will not be greatly increased.

The latest scheme for the extension of the foreign commerce of the Dominion is to establish a line of steamers between Montreal and New York and Para, in conjunction with a steamboat and railway

system extending to the headwaters of the Amazon. Brazil is prepared to make valuable concessions. Thus far the various proposals for lines of steamships to France, the West Indies, &c., emanating from Canadian sources have come to naught.

The Director of the Mint, in his annual report just submitted, estimates the amount of the precious metals in the United States on July 1, 1888, either coined or awaiting coinage, at \$1,100,000,000 in round numbers. Of this \$700,000,000 is in gold and the remainder in silver, as follows:

Coin:	
Gold.....	\$595,349,637
Silver dollars.....	299,708,790
Subsidiary coin.....	76,406,876
Bullion:	
Gold.....	110,469,016
Silver.....	3,950,388
Trade dollars.....	6,545,564
Total.....	\$1,092,429,761

The Florida orange crop this year is equal to 3,000,000 boxes, or at least double the yield of any previous year. This aggregate would load 14,000 cars, for which the railroads will get 60 cents a box, over \$1,800,000.

The New Orleans *Times-Democrat* has interviewed the leading Spanish and Cuban merchants in that city in regard to the question of Cuban annexation to the United States. While nearly all agree that annexation might prove highly advantageous to both, Spain would never acquiesce in such a proposition, on any terms possible.

The future of the United States was pictured in roseate hues by Mr. Gladstone in a recent interview with Minister Phelps. He said: "America has a magnificent future if the American people are only true to their possibilities. Before the close of the Twentieth Century the vast continent embraced within the limits of the United States, stretching from the Atlantic to the Pacific and from the Gulf of Mexico to the great lakes of the North, will be the home of 300,000,000 of freemen, representing every nation upon earth; vaster in extent and population than the Roman Empire in its palmy days, but free from the danger that attended the extension of that empire among barbarous peoples, which was the primary and potent cause of the decline and fall of the greatness of Rome. Every true Englishman should be proud of the progress of the United States, for the Americans are our kith and kin, and having the same literature, the same language and the same sturdy love of political independence. The wresting of Magna Charta from King John prepared the way for the battle of Bunker Hill and the Declaration of Independence." Nothing would give him more pleasure than to visit the United States, he added, but he had never been able to find the time.

Car Demurrage.—Considerable annoyance is being experienced at Chicago by a new rule governing demurrage on cars which has been adopted by the railroads centering at that point. A charge of \$2 per car is now made for each 24 hours after the first 48 hours expiring upon its arrival at Chicago. This new rule has been rendered necessary by the scarcity of cars and the consequent imperative need of having them unloaded as promptly as possible. The inconvenience of such a regulation is felt principally by those who receive coal and coke, but it also extends to consignees of iron and steel. A considerable quantity of pig iron is handled by some dealers on consignment, and the quick sales thus occasioned will prevent them from getting as good prices as would otherwise be the case.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., December 4, 1888.

Senator Allison called up the Senate Tariff bill to-day and will press its consideration until the opposition have developed their position. His purpose, if possible, is to get a vote before the holidays. The bill will require considerable amendment to adapt it to the wishes of certain interests which were assured, before the adjournment, of recognition. This relates notably to the tin-plate duty and to the correction of the coal slack or culm error on the free list. The Senator will make an effort to close general debate without delay and begin the consideration of the bill for amendment.

The Senate Committee on Finance at their meeting to-day decided to grant certain hearings which were omitted or crowded out before the adjournment. Yesterday the Forehand Arms Company, of Worcester, and Colt's Arms Company, of Hartford, were heard. A hearing has been assigned for the razor interests, represented by Mr. Torrey, of Worcester, which may be had after the adjournment of the Senate to-day.

The President's message has materially stiffened the friends of the administration in their determination to adhere to the policy advocated in the message of last year. There is now no doubt that the tariff reformers of the House will renew their fight as soon as the Senate bill reaches their body, which may be regarded as a conclusive indication that there will be no concurrent legislation on the tariff at this session of Congress.

The prospects of a deadlock in the House on the Direct Tax bill makes it more than probable that no business, except the passage of the appropriation bills, will be accomplished at this session, and it may even be doubtful whether they will get through if much time is consumed in parliamentary skirmishing over the direct tax question. If no tariff legislation be reached an extra session may be regarded as a certainty. That question and the admission of the four new States are matters which the Republicans are determined to settle without delay.

Philadelphia advices deplore the gradual disappearance of the grain trade from that port, until at the present time the total shipments are insignificant. The *Record* says: "During the five years between 1883 and 1887, inclusive, Philadelphia held about equal sway with Boston, while during the present year it will fall far below Boston, and both the receipts and exports will be but a tithe of those of New York and Baltimore. The big grain elevators at Girard Point and at Richmond, and elsewhere, are put to but little use, while hundreds of vessels that might otherwise load with grain at Philadelphia are forced to go away with empty holds, or loaded with ballast, to other Atlantic ports."

The Lehigh Coal and Iron Company have erected a plant of 50 beehive coke ovens at West Superior, Wis., in which they are using the screenings of their Connelville coal. A number of the ovens are now in operation producing a very good quality of coke. The managers of the company contemplate introducing the process of the National Coke and Fuel Company to utilize the waste gases and other by-products thrown off by the coal in being coked. The experiments of the company are being watched with much interest by the manufacturers of Duluth and its vicinity, as they will go far toward establishing the advantages to be realized from hauling coal to Duluth and coking it at the point of consumption.

MANUFACTURING.

Iron and Steel.

Announcement is made that the National Tube Works Company, of McKeesport, Pa., has purchased the plant of the Cartwright Iron and Steel Company, at Ali-kanna, near Steubenville, Ohio. The purchasers will begin at once to renovate the plant for the purpose of manufacturing muck iron. They will put in a mill and six double puddling furnaces in addition to the 11 singles and scrap furnace now there, making their capacity 60 tons per day. The works will give employment to upward of 200 men, including 45 puddlers. The muck iron made will be principally 8-inch, and will be used at the tube works.

The new lap-weld furnace now in course of erection in the pipe mill of the Riverside Iron Works, at Wheeling, W. Va., is almost completed and will be fired up in a few days. This additional furnace will give the pipe department facilities to meet the steadily increasing demand for this product.

Wm. Swindell & Bros., engineers and builders of regenerative gas furnaces, Pittsburgh, are engaged in the erection of a large Siemens gas furnace for the Moorhead-McCleane Company, proprietors of the Soho Iron and Steel Works, in that city.

The Valley Iron Works, at Coatesville, Pa., formerly operated by C. E. Pennock & Co., but recently purchased by W. W. Kurtz & Sons, are being repaired and will probably be started up about the 1st of January next, operating one set of rolls, and a full complement of hands will be employed as soon as trade will warrant.

The Pittsburgh Tuyere Works, Limited, formerly the Pittsburgh Smelting Company, Limited, manufacturers of wrought copper and bronze tuyeres, coolers and bosh plates, brass and bronze castings, have removed their office and works to Nos. 83 to 95 Main street, Allegheny.

The 24-inch mill department of the National Tube Works Company, at McKeesport, Pa., has closed down for the winter, and 150 men employed there will find work in other departments of the plant. The demand for 24-inch pipe is over for the present, which accounts for the closing of that department.

On Saturday, the 22d inst., Jones & Laughlins, Limited, of Pittsburgh, will apply for a charter under the name of the Jefferson Gas Company, with a capital of \$100,000. The firm has secured a quantity of natural gas territory in Jefferson township, Washington County, and will drill wells there and pipe the fuel a distance of over 15 miles to Pittsburgh to supply the American Iron Works and Eliza furnaces. A member of the firm states that they will probably not have any gas in Pittsburgh before next summer, but that they eventually are insured against the frequent shortages which have proved so expensive in the past.

We are informed that the report that the Kittanning Iron Company, Limited, of Kittanning, Pa., have been compelled to close down their rolling mill and blast furnace for an indefinite period on account of a shortage in natural gas is without foundation. The firm manufacture only pig and muck iron, and the output of the latter product of October was 1782 gross tons, and for November was 1550 gross tons. The plant was closed down for three days in November on account of the election and Thanksgiving.

For the first time in some years the Glendon Iron Company, of Easton, Pa., have their space nearly a mile long, free of stacks of pig iron. Six months ago the

company had this space occupied by between 20,000 and 40,000 tons of iron, all of which has since been shipped. The amount of iron on their wharf along the railroad has also been reduced, and the supply on hand is now believed to be less than 500 tons. Some of the iron on the mile space was made when the price of rails was \$40 per ton and a large share of it when between \$25 and \$35. Two months ago the company started to prepare three of their furnaces for blast, but it is doubtful if any of them will be in service before spring.

The Andrews Brothers Company, of Youngstown, Ohio, under date of the 27th ult., write us as follows: "We are building four new double-puddling furnaces. These we require to supply our increased finishing capacity."

Some days ago the rim at the top of the Himrod Furnace, which is operated under lease by the Mahoning Valley Iron Company, of Youngstown, Ohio, broke, and allowed the bell to fall. The furnace as a consequence has chilled above the tuyeres.

James P. Witherow, of Pittsburgh, has received a contract for the erection of a blast furnace for the Jefferson Iron Works, of Steubenville, Ohio. The furnace will be 18 x 80 feet and will have a capacity of about 200 tons per day. Work on the foundations has already been commenced.

It is ascertained on good authority that the new rail mill of the Allegheny Bessemer Steel Company, now in course of erection at Duquesne, Pa., may not be put in operation before March 1, 1889. Nearly all the machinery has arrived and is being put into position, but there is a vast amount of work yet to be done, so much so that it is evident that the works will not get started before the time stated above.

The Swindell Construction Company, of Pittsburgh, have about completed a contract for the Riverside Iron Works, of Wheeling, W. Va., which included the erection of one four-hopper gas-producer, each hopper with a grate surface of 24 square feet, one binding furnace, hearth 6 x 24 feet, and a welding furnace with a hearth 7 x 24 feet. Nearly 800,000 fire-brick were used in the construction of these furnaces.

The blast furnace of the Bellaire Nail Works, at Bellaire, Ohio, has been in continuous blast for 26 months, and in that time has produced over 100,000 tons of Bessemer pig iron, and is apparently good for six months longer. The steel plant of this firm is also in continuous operation and is producing an average amount of slabs and billets per day, the larger portion of the output being made in the form of billets for wire rods, sheets, &c. The nail factory department has been idle for some months and will not resume operations until there is a decided improvement in the nail market.

The new furnace of the Cameron Coal and Iron Company, at Emporium, Pa., Joseph Hunt, general manager, was blown in on Tuesday, the 27th ult.

An Associated Press telegram from Joliet, Ill., states that ground was broken there on the 26th ult. for a large steel plate mill, which will employ 1000 men when completed. We are advised by those in a position to know the facts that this statement is premature, and the intention of the projectors is exaggerated. A steel plate mill is contemplated, and perhaps other departments may be added to the works for the manufacture of specialties, but thus far nothing has been settled with sufficient definiteness to warrant the publication of the plans of the projectors. The works will be located near the plant of the Joliet Steel Company, who will ex-

pect to furnish the steel to be manipulated. But a separate company will be organized, the name of which has not yet been announced.

A press dispatch from Springfield, Ohio, under date of the 2d inst. says: "Hon. John Bookwalter, of this city, has been engaged in perfecting and introducing a new process for the manufacture of steel. Steel of all grades and even wrought iron of the highest purity and quality can be produced from the pig iron in eight and one-half minutes and at a cost even less than by any process hitherto known. One great feature of the process is that it can be run with certainty into castings of all forms and sizes, producing castings true to the pattern, remarkably sound and free from pores and bubbles and possessed of extremely high tensile strength and ductility. The Bookwalter plant here is capable of turning out 100 tons per day."

Mr. I. Droege, Sr., has resigned the position as general manager of the Maumee Rolling Mill Company, at Toledo, Ohio, on account of poor health, and has returned to Cincinnati. The board of directors have elected as his successor George F. Russell, of Zanesville, Ohio, who was connected with the old and successful mill of the Ohio Iron Company at that point for a number of years. They have also chosen Mr. Chas. A. Borts, recently superintendent of the Youngstown Rolling Mill, as mill manager. The capacity of the Maumee mill is about 125 tons of finished product per day, consisting of bar, band, angle and shafting iron, flange, boiler, tank and sheet iron and steel. This company will also make a specialty of agricultural iron. The fuel used is natural gas. A blast furnace will be erected at Toledo the coming year, which will be a great advantage to consumers of foundry iron in that locality.

E. S. Cook, manager of the Warwick Furnace, Pottstown, Pa., writes to us that that famous record-breaker has outdone its own past achievement. For the week ending November 24 the furnace made 702 tons of iron, 250 tons being No. 2 foundry and 452 tons open gray forge, using three-quarters anthracite coal and one-quarter coke. So far as we are informed, this exceeds any product yet obtained, with anthracite coal as the principal fuel, from stacks of moderate size. Warwick furnace is only 55 feet high, and has a 15½-foot bosh.

Machinery.

The Marion Steam Shovel Company, of Marion, Ohio, under date of the 26th inst., write us as follows: "We are now running on full capacity and have placed our order for quite an additional line of machinery to be placed in our shops, so as to be able to double our present capacity, which is necessary to fill our immediate demands."

Morse, Williams & Co., manufacturers of elevators at Philadelphia, in addition to their office at 108 Liberty street, New York, have recently established a branch office at 14 High street, Boston.

The Freeport Machine Company, of Freeport, Ill., made an assignment on the 27th ult. The assets are roughly estimated at \$40,000, of which \$24,000 is in notes and bills receivable, while the liabilities are put at \$27,000. The failure was precipitated by dissensions among the stockholders. The company have been in existence about seven years, had a capital of \$50,000, and were engaged in the manufacture of windmills, feed mills, cultivators and other agricultural implements.

The Gordon & Maxwell Pump Company, of Hamilton, Ohio, are at present working on a contract for three sewage pumps for Hyde Park, Ill., with aggregate

capacity of 9,000,000 gallons, two water works pumps for Troy, Ala., with capacity of 2,000,000 gallons, and two for Gladwin (Mich.) Water Works, with a capacity of 1,000,000 gallons. The company have thus far this year sent out over 40 pumps for water works in various parts of the United States.

The Heine Safety Boiler Company, of St. Louis, have been asked to bid on boilers, heaters, pumps and piping for 1000 horse-power steam plant for London, England.

The Crescent Foundry Company, of Allegheny City, Pa., who started a foundry in Brady's Bend, Pa., some months ago, have been compelled to shut down permanently on account of scarcity of natural gas and raw material which is used in making castings. The company occupy a section of the old Brady's Bend Iron Company's property, and had extensive buildings erected. Forty men were employed. The works will soon be removed to Allegheny.

Mr. J. W. Angell has been appointed to represent Russell & Co., of Massillon, Ohio, agricultural machinery manufacturers, in St. Louis, and will have his headquarters at No. 609 Pine street, in that city.

The Miller Chemical Engine Company have been incorporated at Chicago, with capital of \$300,000, for the manufacture of fire engines. The incorporators are A. Montgomery Ward, G. R. Thorne and J. W. Miller.

Miscellaneous.

Among recently authorized corporations in Illinois are the following: Lion Mfg. Company, East St. Louis; capital, \$75,000; incorporators, H. F. Fellows, George A. Bannantine and Charles K. Paddock. Colby Cook County Testing Machine Company, Chicago; capital, \$100,000; incorporators, George L. Hogg, Addison E. Shaffner and Everett W. Kibbe; to manufacture a weighing machine, lung tester, lifting machine and measuring machine for light, all combined in one. International Construction Company, Chicago; capital, \$50,000; to build and equip railroads; incorporators, Lawrence C. Boyle, John R. James and John Ritchie. Rouse, Hazard & Co., Peoria; capital, \$80,000; to manufacture agricultural implements, carriages and type-writers; incorporators, Harry G. Rouse, Samuel B. Hazard and Sylvester Doubet. Certificate filed to increase the capital stock of the Machinists' Supply Company, Chicago, from \$25,000 to \$100,000; also, Illinois Malleable Iron Company, of Chicago, to \$50,000.

A company under the name of the American Catalogue Company has been formed at Minneapolis, Minn., for the purpose of arranging and binding under cover several catalogues of the same class. The object of this is to furnish the purchaser of machinery a complete and well arranged reference book of the class of machinery that he is likely to use. Another important object is to place the manufacturers' catalogue in the hands of those who will likely be his customers, and in such a way that when once placed it will be preserved from loss or damage. A few of the bound volumes of catalogues, we understand, have been in use for the past three years, and their usefulness and value have been such as to cause the formation of a company for the classification and binding of them for general use. The company are now collecting a large assortment of catalogues, so as to make the classification as complete as possible, and will probably send out the first volumes about the first of the year.

A company embracing a number of Chicago, Cleveland and other capitalists have been incorporated at Lima, Ohio, under the name Lima Lock Mfg. Company. The

capital is put at \$250,000, and the company will erect a factory, which it is stated will employ 500 hands.

Silver Coinage and Coin Certificates.

In his annual report Secretary Fairchild dwells as follows on the silver coinage and on the system of coin circulation by means of silver certificates:

The ownership of silver by the Government again was largely decreased, in spite of the increase of the total stock of silver dollars in the country, by the coinage of 16 months. During the past few years the decrease of circulation caused by the cancellation of national bank notes and by the deposit of money with the Treasurer by the banks to redeem their notes when presented for that purpose has been but little exceeded by the increased circulation of silver certificates and of standard silver dollars; thus silver seems to have filled the vacuum caused by the retirement of national bank circulation. The circulating medium in small denominations has been largely converted into silver certificates. And finally business has largely increased in the South and in portions of the country where there are few banking facilities. All of these causes have co-operated to postpone any evil effects which might arise from a continued and excessive coinage of the silver dollar; but the danger still exists and should be guarded against. This can be done by the adoption of the recommendation of my last report, viz., by fixing the maximum of silver which shall belong to the Government and by providing that when it was exceeded by \$5,000,000 the purchase of silver bullion should cease until the amount owned by the Government should be again reduced to such maximum, or by canceling United States notes to the amount of the excess over the maximum, provided the Government held the notes; if not, then by ceasing the purchase of bullion. Such plan, if adopted, would provide a safety valve which would be self-operative, and would assure the country against any possible danger from silver, for as soon as it exceeded the amount which could be absorbed in the business of the country it would begin to flow into the Treasury in payment of taxes and would be there held until business called for it, and when the Government's ownership fell below the maximum the purchase of the bullion would again begin.

Thus the country's business demand would regulate the country's silver circulation and there would be little danger of depreciation in the value of the silver dollar as compared with the gold dollar. I venture to predict that if some such safeguard is not adopted and if thereby the silver dollar is suffered at some time to lose a part of its purchasing power, that the people will demand the absolute stoppage of the silver bullion purchase, and, furthermore, the use by the Government of the whole or a portion of the silver coinage profits for the redemption of the silver dollars which are held by them. It is to be hoped that before such crisis is reached that the nations of the world will have agreed upon some standard of bimetalism which will forever maintain a fixed ratio between gold and silver, but in the meantime there is no occasion to burden ourselves with a stock of silver which may be troublesome.

The system of coin circulation by means of certificates has certain conveniences and advantages, but it is a costly form of money; last year the cost of the \$105,000,000 silver certificates issued was about \$421,000, and as more and more of these certificates are converted into smaller denominations this cost is likely to increase.

There are also certain dangers connected with it—for example, in time of war, the possession by the Government of such vast stores of the precious metals might prove embarrassing, and at a time when the Government was in financial need the temptation to spend the coin held against outstanding certificates might prove too strong. The loss by the abrasion of the coin, if it was in circulation, would not equal the cost of the certificates; on the whole, I think it may be said that the currency of the country would be more safe and more economical if the coin were in actual circulation instead of being held by the Government on pledge against outstanding certificates, as is now the case. But whatever may be thought about the wisdom of the certificate system there can be no doubt that with it the further coinage of gold and silver, except subsidiary coin, is not necessary or wise. Far more gold and silver coins are now in the possession of the Government than probably ever will be needed for the redemption of certificates. Future accumulation of the precious metals should be only in the form of bullion, which can be kept more safely and counted more easily than the coin. If this suggestion was adopted all but one of our mints might be closed, and large, useless expense be saved annually. I earnestly call the attention of the Congress to this subject.

Heating Buildings by Exhaust Steam.

At a recent meeting of the New England Railway Club, John A. Coleman said:

I have had a long experience in heating buildings by steam. When the matter of using exhaust steam was agitated, and most people were opposed to it, we took a number of mills, using then a 16-foot tubular boiler, and averaged a ton of coal a day. We heated the mill by using large pipes, having the circulation as straight as possible, open and free, with about 2 pounds back pressure on the engine, using no direct steam except in the morning in starting up and on Sundays. I had similar experience in heating the building of the Providence Tool Company during the war. The building was 70 feet wide by more than 200 feet long, the rooms with 15 foot studs, and large windows in an exposed situation, then heated by small pipes all around the walls, and using about a ton of coal a day for the boiler. In reconstructing we took out the small pipe, cut it up into coils, which we placed in the center of the building, using a 6-inch pipe as the main artery through the building, and a 2-inch socket-pipe for the condensed water, avoiding bends everywhere as much as possible. Result was that the building was overheated by using only exhaust steam, and about 2 pounds back pressure and no extra coal was used for the fires. My idea in heating is to use large pipes and carry a large body of steam to the point where you want to use it, and not strangle it on the way.

Morris J. Lippman, late of Graff, Bennett & Co., has been appointed agent for A. and P. Roberts & Co. Pencoyd Iron Works, Philadelphia, Pa., and has opened an office in the Commercial Building, southeast corner of Sixth and Olive streets, St. Louis, Mo.

The Metric Metal Company, of Beaver Falls, Pa., a recently chartered corporation, have leased a portion of the cutlery works at Beaver Falls, and machinery is now in place, and operations begun in the manufacture of natural gas meters and natural gas burning appliances. The company are largely interested in natural gas enterprises.

The Iron Age

New York, Thursday, December 6, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Crisis in the Steel Rail Trade.

A good many contradictory statements have been published in the newspapers during the past week about the steel-rail trade. To some extent they echoed some of the opinions expressed at the recent meeting of manufacturers in this city, pet plans being thus ventilated as though they had received general acceptance. During the meeting held a week since there was a general and a free interchange of opinion, but very little that was definite was agreed upon. It was proposed to so modify the association that minimum prices be agreed upon. That proposal met with an emphatic rejection by a number of the active manufacturers. The plan of establishing a common sales bureau, through which the orders would be distributed, met with a similar fate, so far as all the mills outside of the Chicago district are concerned. The only action finally taken was to allow of the sale of tonnage allotment by one mill to another.

The condition of the steel-rail trade is a sad commentary on the inadequacy of trusts and combinations. The rail manufacturers have been violently assailed during the past year as members of an iniquitous ring, and yet they have not even had the consolation of reaping the pecuniary rewards which trusts are supposed to confer upon their unscrupulous members. The fact is that the ties binding the members of the steel-rail association have had the strength only of the traditional rope of sand. So long as there was work enough for all at good prices, allotments were sacred. When business fell off the fact that the quantity allotted it was sold did not always deter a mill from securing a desirable order. The contest grew fiercer and fiercer until finally steel rails sold in the West at \$25 at mill. This has been done in more than one instance in the past two weeks, and while there is no direct proof that it has been done since the New York meeting, there is evidence that low prices are still being made.

There are those among the steel-rail manufacturers who believe that some plan can be devised by which the ruinous competition now going on can be ended. They are urging further conferences, which probably will be held. But others frankly acknowledge that natural causes alone can bring improvement. Railway managers acknowledge that rails are too cheap. They admit that the cost of renewal of track is ridiculously low, but many of them must confess that they have not got the money to take advantage of the opportunity offered. If the interests of the carriers of the country were not so thoroughly disturbed as they are the demand for rails would quicken most rapidly. There are many who insist that the railroad companies, for purposes of their own, are not adverse to having their

sufferings pictured in dark hues. But while these somber tints prevail it is difficult, if not impossible, for railroad managers to negotiate paper or for those who are building new roads to place bonds. The situation to some extent, therefore, appears worse than it really is. It may improve very rapidly so far as the Western mills are concerned. A few large orders may cause a recovery of a few dollars a ton, but, until that has occurred, the Eastern mills cannot hope to take any business. They are cut out of the whole West, and for the time being are driven out of the Southern market by Pittsburgh mills. They do not expect any new business in their own territory, east of the Allegheny Mountains and north of the Potomac River, simply because nearly all of it has been placed in the past two months. So far as the possibility of securing new orders are concerned, the Eastern mills have a barren future before them. Whether it is a matter much to be deplored by them may be questioned, since every sale of rails at competitive prices to-day involves a loss of a round sum to even the best-equipped and best-located mills in the country. We have heard of managers of some mills claiming to be able to produce rails at very low figures, but usually they themselves have acknowledged the inaccuracy of their statements, when the occasion which gave rise to them passed. While the crisis in the rail trade is not yet over, there are some indications which point to the return of more reasonable prices.

Progress in the Navy.

Secretary Whitney's annual report, which was issued last week, is in many respects an interesting document, and affords, undoubtedly, the most complete and trustworthy measure yet given of what has been accomplished in the Navy Department during the present administration. The accounts published from time to time during the past few years, reviewing the work done, have necessarily been of a fragmentary character, and information on the exact state of the navy has been more or less uncertain. The facts and figures now given, however, are entirely comprehensive and cover not only the results more recently attained in the United States, but refer also to what has been done in some lines by some of the foreign powers.

Briefly stated, the efforts of the Navy Department in ship construction have, since March, 1885, been devoted to unarmored vessels, the importance of this branch of naval armament having been very widely appreciated. As a result we have now the cruisers Boston and Atlanta and the dispatch boat Dolphin in shape for service, while the Chicago is practically completed, and several other vessels, like the Baltimore, Charleston, Yorktown and the dynamite cruiser Vesuvius, have been launched, and are being rapidly fitted out. In the line of torpedo boats also a good beginning has been made. With armored ships, on the other hand, but little has been done, the armored cruiser Maine having just been commenced at Brooklyn, and work on a few of the monitors having been carried on only in a desultory manner for several years. In the design of the battleship Texas some

changes, we understand, are yet to be made. With reference to the criticisms which have been liberally bestowed upon Secretary Whitney because of disappointing performances of some of the vessels already completed, and defective material and injudicious design in some of the others, it must be admitted after all that the work done is, in the main, satisfactory, and reflects credit upon the department. The severe attacks which have been made upon the alleged policy of the Department of building an English-American navy have but a slim basis and are scarcely worthy of consideration. For years the ships of the British navy had been held up as standards of excellence, and the question why their designs could not be profitably followed or adopted in modified forms in this country had been brought prominently forward on more than one occasion. The question has been practically answered by carrying out several such designs, which, moreover, appeared to be of special merit, and if the results have not been particularly flattering, they have at least taught a lesson worth knowing, and perhaps have effectually put a stop to the floods of non-professional advice which, only a short time ago, poured in upon the Navy Department. The last year alone has brought many surprises to naval authorities and to the public at large, and some of the features which in the near past were regarded as eminently desirable in the construction and outfit of a warship have since been condemned by practical test. It is impossible that, under such circumstances, ships and machinery can be constantly kept up to the requirements of the present.

The question of speed of warships, and particularly of cruisers, is an important one, and has deservedly been given much attention. The rate of speed has gradually been raised from 12 and 13 knots to from 14 to 22 knots per hour, and to secure these higher figures reduction of weight of machinery has been carried out almost wholly regardless of the results consequent upon reduced strength and rigidity, and of ultimate serviceableness. This applies not only to English ships, which have of late been more specially noteworthy for breakdowns, but with equal propriety to all of modern design—a fact borne out by the narrow time limits which it has been found necessary to adopt for trial trips. As at present constructed a vessel, with the best possible management in the engine-room, is barely enabled to go through a six-hours' trial satisfactorily, and, as has frequently been pointed out, will probably never again, under ordinary circumstances, be called upon to go through a similar performance. Should such a requirement present itself, even though the time of running at full speed be not more than two or three hours, a breakdown, as experience has shown, will be the inevitable result. Yet the vessels are rated according to their trial-trip speeds. What dependence, therefore, can be placed upon ships, classified under the present system as capable of developing, say, 18 or 19 knots, can be readily imagined.

The position has been repeatedly taken, and with good reason, that it were better the vessels were rated lower, in accordance with their actual capabilities, so that there would be the assurance at all times that the speeds counted upon could be attained

without difficulty. It is a dangerous folly to deceive one's self with the belief in a reserve of power which in point of fact is only imaginary. It is not reassuring, therefore, to find in Secretary Whitney's report the conclusion that "the machinery of naval vessels ought to be so designed as to produce 10 horse-power for each ton of machinery; and it was determined to make that the standard, and to enter into no contracts that were not based substantially thereon." This would correspond, at the outside, to a weight of only 224 pounds per horse-power. Whether or no this includes the boilers is not quite clear, but we presume it does not. If it does, the figure is ridiculously low, much lower than the weight ruling in the British navy—360 pounds per horse-power—and which itself has been found entirely insufficient to secure the strength necessary for the work required of the machinery. Assuming the 224 pounds to represent engines alone, and adding, say, 196 pounds per horse-power for boiler capacity, we would get 420 pounds per horse-power. This represents an increase over the British weight perhaps just sufficient to make all the difference between success and failure. Still it falls considerably short of the weight per horse-power ruling in high-class merchant steamers, which, as is well known, head the record of good performances, considered from whatever standpoint—speed, durability and economy. There is not now, so far as we know, a warship afloat which has been known to steam, or which could, in case of necessity, steam at full power for several days consecutively, nor even for a few hours, while in commission. In this respect they all fall entirely below comparison with what is being accomplished day after day, without intermission, by any one of a number of Atlantic steamers, and in these, it may be safely assumed, the weight of machinery has been kept down to a minimum consistent with safe working. There is only the one previously mentioned conclusion to be drawn from all this, that marine engines in the several navies are much too light for the power which they are supposed to be able to develop. It is only fair to admit here that the design of the machinery for a merchant steamer and that of the machinery for a man-of-war do not present parallel cases. In one instance, ample head room is available, while in the other, compactness is of the first importance, and the whole machinery, or as much of it as is at all possible, must be placed below the water-line. This condition alone often entails the necessity of having smaller and lighter parts in the design than would otherwise be desirable. Still, an effort should be made to adhere as closely as the circumstances will permit to examples of established success.

Secretary Whitney has evidently not lost sight entirely of the shortcomings of the engines designed for naval purposes, for to a table which he has compiled of foreign high-speed cruisers he appends a note to the effect that the speeds given are trial speeds and that a reduction of from 10 to 12 per cent. should be made to get corresponding maximum sea speeds. It would have been more correct to say simply that on regular cruises the engines could not be worked up to their full power or anything approaching it; but even as it is

the qualification is suggestive. The point cannot be made too prominent that a 19-knot cruiser on paper is not a 19-knot cruiser in practice, and that what up to the present time has been gained in speed on the trials by reducing the weight of machinery has been a gain so-called which can never be realized in actual service, and which even if attainable would have been secured at the expense of reliability and general efficiency. The conditions laid down for the designer of the naval marine engine of the present day in most of the cases directly invite disaster, though they might, we think, be easily modified so as to effect general improvement, Secretary Whitney seems to fully realize this when he says that "too much has heretofore been sacrificed to reducing weights of machinery beyond the limit necessary to secure desirable results. An increase of weight and machinery found necessary properly to maintain the desired speed entails either a reduction of ordnance, coal and other weights or an increase of displacement in each type; and this latter is the direction in which designs of cruisers (not especially built for police duties in time of peace) are now advancing." This would seem to show that Secretary Whitney, at least, is in favor of a very desirable departure from the policy now followed, though the developments will depend largely upon his successor. Taken altogether, what has been done thus far in adding to the navy has, for obvious reasons, been somewhat in the nature of experiment, and the results have been all that could be reasonably expected. The work, we believe, has been conscientiously done and constitutes a good basis for further operations.

The Copper Situation.

The copper and brass manufacturers have again made their contracts for copper for delivery during the next three months, the quantity, it is said, being larger than was involved in any previous sale. Manufacturers evidently have been punished in the past by the syndicate for taking less than they needed. They have been forced to pay anywhere from one-eighth to quarter of a cent above the contract price for additional copper. Manufacturers have been taught that it is very difficult, if not practically impossible, to secure any metal equivalent to Lake from outside sources, and that there is no superabundance of other grades not controlled by the ring. So far as we can gauge the situation the brass and copper manufacturers have been whipped into line and have practically given up any opposition to the syndicate. In spite of the editorial broadsides fired at regular intervals at the latter, its position is securer to-day than it has been for a long time. Well-informed men in the copper trade estimate that the syndicate must be carrying a stock to-day of not less than 125,000 gross tons. The European statistics are not complete. It is known that they do not include copper in some private French warehouses. They do not count accumulations of precipitate at the Spanish mines. Then the syndicate was until lately piling up copper at a lively rate in this country. It is reported that the stock at tidewater includes 6000 gross tons of Lake copper, 2000 gross tons of Arizona and other in-

gots and bars, 5000 tons fine of Boston and Montana matte, and 2000 tons fine of Anaconda matte. Here we have 15,000 tons alone. It is evident, therefore, that even if the Calumet and Hecla fire did cut off the whole supply of that mine there would be no danger of scarcity, except that the supply of shapes—that is, wire bars and slabs, of which the great concern has almost a monopoly—would be temporarily light. But, as a matter of fact, the misfortune of the bonanza mine is of little interest to anybody but its stockholders. We are officially informed that the Black Hills ground is open, as before, and that this part of the property is capable of furnishing 4,000,000 of pounds monthly—that, in fact, the greater part of the product has come from that section, even during the past few months. The possible small restriction in the supply from that source may be considered insignificant.

But of late another matter has developed which opens up very serious possibilities to the manufacturers of this country. We have lately dwelt upon the embarrassments and perplexities of brass-makers who are paying tribute to the syndicate and to the mining companies. It appears that recently domestic brass manufacturers have found themselves undersold in this country by foreign makers. Partly manufactured brass has been imported. Now, the Société des Métaux is the largest brass and copper manufacturing concern in Europe, controlling the French trade and having branch works in other Continental countries. It is evident that the Société will do all in its power to keep its own mills going to full capacity, and that it has a great advantage in so doing in the cheap copper it has at command. While American brass and copper manufacturers are paying 16½ cents, the syndicate gets copper in Europe equivalent in quality at about 13 cents, and makes a profit of about 1 cent on every pound it sells to other manufacturers. In reality it can deliver its own copper to its own mills on the basis of, say, about 12 cents. The spelter used in the brass is cheaper; its labor is lower, so that it can easily sell in this or any other country, where it has no mills, at a lower price than the home manufacturers, in spite of a tariff.

We do not charge directly that the Société is the one which is doing the selling of manufactured brass in this country. Possibly it may be somebody else crowded out of his own market by it. But with a concern as large as the Société is as a manufacturer, the temptation is great to seize the trade of others when its own is affected adversely in volume by restricted consumption. This is one of the possibilities of serious injury which may be inflicted upon a great industry, sorely pressed now by being forced to pay tribute to a gigantic gamble. There is little sense in wasting time now over predictions of ultimate disaster to the gamblers themselves. Every one sincerely hopes that they may not be successful in slipping out of some side door finally. No one has any sympathy with the syndicate except those who are its beneficiaries now, and the majority of whom will probably be nimble enough to get out before the crash comes. But opposition to the syndicate should not blind us to a correct appreciation of its power. Its grip seems as firm now as it has ever been.

and, as we have indicated, it has opportunities for mischief in other directions which may lead to invoking legislative protection.

Basic Versus Acid Wire Rods.

Always excepting tin plate and spiegel-eisen, there has been no branch of the iron and steel trade in which foreign material has played so important a part as it has in wire rods. With the rapid growth in popular favor of the barb-wire fence, and latterly of wire nails, the demand for wire developed enormously. The importations of foreign wire rods assumed very great proportions. Unfortunately the import statistics did not specially enumerate this article until 1884. Since then the quantities brought in have been as follows:

Imports of Wire Rods.

Year.	Gross tons.
1884.....	129,933
1885.....	93,882
1886.....	136,965
1887.....	149,350
Nine months 1887.....	122,263
Nine months 1888.....	82,098

It will be observed that the imports during the first nine months of the current year indicate imports of about 100,000 gross tons, a falling off of about 50,000 tons. The statistics of the production of wire rods are not obtained by the American Iron and Steel Association, the only cue to the quantity made being furnished by the statement of G. T. Oliver, before the Senate Finance Committee, that in 1887 the output was 188,738 tons, the capacity of the American mills being placed then at 285,000 tons. Since that time it has expanded further, and more mills are building or contemplated, so that the claim has been seriously made that in 1889 the United States will come to the front with a product of 800,000 tons at least, and possibly 925,000 tons. Importers concede that they expect to do comparatively little business in foreign common rods in the future. They have been crowded out of the great Western markets, and have only a moderate trade to look for east of the Alleghenies, and at or near tidewater. The capture of so great a trade by American producers is naturally a source of much gratification.

There is one point in connection with the progress of American industry in this particular branch which we have believed it to be of interest to investigate. When the basic process rushed into prominence in Germany it was soon found that the product of the new process was particularly well adapted for wire purposes. Until lately no basic Bessemer or open-hearth steel was made in this country, and of what little is made none, so far as we know, is drawn into wire. Unless imported basic billets are used, the wire rods rolled in American mills are of acid Bessemer stock. Now, importers have steadily claimed that the latter was not as suitable for wire purposes as the basic material. The latter they urge is so much softer that it can be drawn down further without annealing. Some have insisted that, therefore, basic rods are worth at least 50 cents more a ton, and possibly \$1 per ton.

We have made inquiries on the subject from manufacturers of barb wire, of wire nails and of market wire. Those among them who have no affiliations whatever

with steel works or American rod mills frankly state that they prefer the basic material, one of them putting it in the following words: "We find that the basic rod will draw down much easier and will not cold, harden like Bessemer. It is easier on the tools, and for uniformity is much more desirable than the acid rod." Another wire manufacturer expresses the opinion that since the basic rods have come into use there has been a decided improvement in the quality of acid rods, so that now the latter are used by the wire-makers in many grades of wire for which they were formerly not considered suitable. One wire drawer informs us that some of the domestic material he has received was poor in quality—that he would not have any of the same make at any price, while other American rods were equal to any of the imported stock. He reports that as long as imported No. 6 basic rods of uniformly good quality can be bought for the same money which No. 5 domestic rods bring he will continue to purchase the foreign.

The managers of a number of the leading rod mills, all of them manufacturing wire also, write in very much the same strain. The majority of them admit that the foreign basic rods are a little softer, and agree in recognizing that there is some advantage in its being smaller—that is, the foreign rods are No. 6, while the domestic rods are No. 5. One of them, however, states that in his experience the slight difference between the two is entirely overcome in drawing by the intelligent use of a proper coating. Others insist that the rustiness of foreign rods more than makes up the difference in cost gained by their being softer and smaller.

This point has been brought out very clearly in our correspondence, that wire manufacturers do not consider the differences in quality of foreign basic and domestic or good foreign acid rods important enough to warrant any material difference in the price. Fifty cents a ton, or a maximum of 75 cents is as much as the majority of them seem willing to pay. This result has a significance beyond the question immediately at issue. If ever the United States is to become a producer of basic steel on anything like a large scale, the first channel into which its product is likely to go is the wire trade.

Argentine Loans and the Gold Drain.

The gold drain, which for months past has been going on from Europe toward the Argentine Republic, being the proceeds of loans floated, has at length begun to cause considerable uneasiness among financial men, not only in Europe, but in New York. While Buenos Ayres has drained London and the Continental money centers New York has in its turn been drawn upon by these. Thus, during the week ended November 24, Wall street bankers shipped no less than \$4,142,000, gold, supposed to be bought, most of it by the Bank of England, which is fortifying itself in order not to be obliged to raise the discount still further. As Hamburg had bought German gold coin and bars in the Bank of England, and shipped \$2,000,000 thereof to Buenos Ayres on November 19 and 20 by two steamers, the bank raised the price of such coin to 76/8, and bars to 77/11. From January 1

to November 24 the gold shipments from the United States amounted to \$36,500,000, as compared with \$14,000,000 for the corresponding period of 1887, while the receipts have been but \$7,500,000, as against \$39,000,000 for the same period last year—in other words, we have shipped \$22,500,000 more, and received \$31,500,000 less than last year, in a little less than 11 months, a difference of \$54,000,000, gold. Last month an experiment was even made for European account, and \$500,000 gold were shipped from New York to Buenos Ayres per steamer direct, as it was thought this might prove a cheaper method. Should the drain on New York continue, it would unquestionable lead to a stringency in our money market, and something of an upheaval in Wall street.

Fortunately, the stock of gold in bank in Europe and America on November 1 was about \$100,000,000 larger than at the same date last year; the drain is, therefore, for the moment less felt than it otherwise would. Reduced to millions of francs, it was as follows, compared with the year before:

	Nov. 1, 1887.	Nov. 1, 1888.
Bank of England.....	502	514
Bank of France.....	1,146	1,022
German Federal Bank.....	475	732
German Banks of Issue.....	137	192
New York Banks.....	394	462
Bank of Holland.....	101	128
Austro-Hungarian Bank.....	160	190
Italian National Bank.....	178	205
Italian Banks of Issue.....	128	149
Belgian National Bank.....	98	86
Bank of Portugal.....	16	29
Russian State Bank.....	844	964
Totals.....	4,183	4,682
Increase.....	499	

As the Argentines have to pay interest in gold in Europe for the enormous amount of money they owe, something like \$50,000,000 gold will have to flow back to Europe during a twelvemonth on that account, but this counter-current is nourished from month to month, while the proceeds of loans are drawn for from Buenos Ayres on Europe in big lots. Between January 1 and November 15 of the current year no less than 28 Argentine loans were placed on the markets of Europe, aggregating £28,702,766, or \$143,500,000 American gold. For the latter half of 1888 \$40,000,000 gold were expected from Europe, the Bank of England alone having shipped during the first six months £3,500,000 to the Argentine Republic. Nobody denies that the Argentine Republic is flourishing now more than it ever did before, but the paper basis on which the finances rest at home and the extraordinary inflation of the value of real estate and wild speculation generally centering at Buenos Ayres, recommend caution. Thus one of the leading newspapers in the latter city expresses itself about the general condition of the country in the following manner, under date October 18 last: "The Argentine Republic grows, blossoms and thrives not only from a material point of view, but morally and intellectually. New schools are springing up in all directions, and the Argentines themselves are becoming more and more laborious; formerly they, most of them, used to despise work. New banks, manufacturing and colonizing enterprises are being founded almost daily. At the same time mechanics, many of whom for some time past Argentines, and shopkeepers begin gradually to form a more and more solid middle class. Trade and traffic are

getting livelier all along in consequence of the fine cereal crops we have and the remunerative prices our grain fetches in Europe. The only dark cloud in the horizon is the high gold premium, which does not decline in spite of the extraordinary amounts of gold we are receiving from Europe; the premium is indeed a constant source of uneasiness for us. Why the premium remains so high is to us an impenetrable mystery, which it would be difficult to explain."

With the experience we have had with an irredeemable paper money, and the gold premium in the United States during and after the war, the mystery alluded to does not seem to us so deep; it is in reality more confidence which brings down a gold premium than a stock of gold which does not circulate in the country, flooded as the Argentine Republic is with paper currency. The latter has now taken hold to such an extent among the people down there that a return to specie payment cannot now be thought of, because it would bring down the inflated values, city real estate included, with a rush, and precipitate a big financial and monetary crisis. Hence the premium on gold will only begin to decline if a resumption of specie payment can be prepared for gradually, and thereby confidence in the paper tokens of many forms which have been cropping up restored. With us it was confidence in the intrinsic value of greenbacks and national bank-notes that brought down the gold premium, because our Federal debt was rapidly being reduced instead of increasing all along, as has been the case in the Argentine Republic. With their great enterprise in all directions, and insatiable loan absorption, the Argentines have created a situation which is, and remains, dangerous, their great present prosperity and heavy immigration notwithstanding.

Pittsburgh Freights.—The following new reduced freight rates from Pittsburgh to St. Paul and Duluth, Minn., went into effect on Saturday, the 1st inst. The new rates are via the Duluth, South Shore and Atlantic Railway, and are as follows: First class, \$1; second, 90 cents; third, 70 cents; fourth, 45 cents; fifth, 35 cents; sixth class, 30 cents per 100 pounds. Iron will be 35 cents in less than carload lots and 80 cents in carloads.

George A. Schuler, a member of the well-known firm of McClure & Schuler, engineers and contractors, Pittsburgh, Pa., died at his residence in that city on Sunday, the 2d inst., in the 61st year of his age. Mr. Schuler was in his usual health until the Saturday evening preceding his death, when he was suddenly stricken with apoplexy while attending to business. He was taken home and died the next morning, as stated. Mr. Schuler had an extensive acquaintance among the iron and steel manufacturers of the country, and had an enviable reputation for honesty and integrity in all his dealings. His funeral took place on Tuesday, the 4th inst., from his residence in the above-named city.

Quite an unusual proceeding among railroad corporations is the action of the Atchison, Topeka and Santa Fé and the Chicago, Santa Fé and California railroad companies, in filing certificates at Springfield, Ill., on the 30th ult., decreasing their capital stock. The capital of the former was cut from \$10,000,000 to \$5,000,000, and that of the latter from

\$30,000,000 to \$15,000,000. A great many other companies would doubtless more nearly approximate the actual investments made by the original stockholders if they were to follow the example set by these two companies.

The Message and Accompanying Documents.

President Cleveland's message, to a very considerable extent, is an epitome of the reports from the several departments. Respecting foreign relations the President has the satisfaction of announcing that: "there is no existing subject of dispute between the United States and any foreign power that is not susceptible of satisfactory adjustment by frank diplomatic treatment." By the cessation of Chinese immigration it is hoped, in reference to our relations with China, that a cause of unkind feeling has been permanently removed. The recommendation as to a treaty of reciprocity with Mexico is renewed, and the reorganization of the consular service is referred to as a serious matter. Little favor is shown to the contemplated Congress of American States to be held in Washington next year, the President expressing the opinion that "commercial policies inducing freer mutual exchange of products can be most advantageously arranged by independent but co-operative legislation."

The total revenues of the Government for the fiscal year ended June 30, 1888, amounted to \$379,266,074.76, of which \$219,091,178.63 was received from customs duties and \$124,296,871.98 from internal revenue taxes. The total receipts from all sources exceeded those for the fiscal year ended June 30, 1887, by \$7,862,797.10. The ordinary expenditures of the Government for the fiscal year ended June 30, 1888, were \$259,653,958.67, leaving a surplus of \$119,612,116.09. The decrease in these expenditures as compared with the fiscal year ended June 30, 1887, was \$8,278,221.30, notwithstanding the payment of more than \$5,000,000 for pensions in excess of what was paid for that purpose in the latter mentioned year. The revenues of the government for the year ending June 30, 1889, ascertained from the quarter ended September 30, 1888, and estimated for the remainder of the time, amount to \$377,000,000; and the actual and estimated ordinary expenditures for the same year are \$273,000,000, leaving an estimated surplus of \$104,000,000, exclusive of the requirements of the Sinking Fund, amounting to \$47,000,000 annually. The estimates of the appropriations required for the Government service for the fiscal year which will end June 30, 1890, aggregate \$323,467,488, which is \$3,063,305 less than the estimates for 1889 and \$3,530,511 more than the appropriations for the current fiscal year. The cost of collecting the customs revenues for the last fiscal year was 2.44 per cent.; for the year 1885 it was 3.77 per cent. The excess of internal revenue taxes collected during the last fiscal year over those collected for the year ending June 30, 1887, was \$5,489,174.26, and the cost of collecting this revenue decreased from 3.4 per cent. in 1887 to less than 3.2 per cent. for the last year. The tax collected on oleomargarine was \$728,948.04 for the year ending June 30, 1887, and \$864,139.88 for the following year.

With regard to the surplus devoted to the purchase of bonds, the President remarks: "If this surplus, under the operation of just and equitable laws, had been left in the hands of the people it would have been worth in their business at least 6 per cent. per annum. Deducting from the amount of interest upon the principal and premium of these bonds for the time they had to run at the rate of 6 per cent.

the saving of 2 per cent. made for the people by the purchase of such bonds, the loss will appear to be \$55,760,000. This calculation would seem to demonstrate that if excessive and unnecessary taxation is continued and the Government is forced to pursue this policy of purchasing its own bonds at the premiums which it will be necessary to pay, the loss to the people will be hundreds of millions of dollars." The purchases of bonds have been (par value), up to November 30, \$94,700,400, and the premiums have amounted to \$17,508,613. Counting the money as worth in the hands of the taxpayers 6 per cent., there is on this transaction a net loss of \$55,760,000. On November 30 the silver coinage amounted to \$312,570,999, of which \$60,970,990 were in actual circulation, together with \$237,418,346 in the form of certificates. The suspension of silver coinage is earnestly recommended.

Of more direct interest to manufacturers are the references made to the plans and specifications of the Board of Ordnance and Fortifications, as provided for in the act of September 22 last, calling for forgings for heavy guns and mortars. The bids for the steel forgings are to be opened on December 20, 1888, and for the mortars on December 15, 1889. A board of ordnance officers was convened at the Watervliet Arsenal on October 4, 1888, to prepare the necessary plans and specifications for the establishment of an army gun factory at that point. The preliminary report of this board, with estimates for shop buildings and officers' quarters, was approved by the Board of Ordnance and Fortifications November 6 and 8. The specifications and form of advertisement and instructions to bidders have been prepared, and advertisements inviting proposals for the excavations for the shop building and for erecting the two sets of officers' quarters have been published. The detailed drawings and specifications for the gun factory building are well in hand and will be finished within three or four months, when bids will be invited for the erection of the building. The list of machines, &c., is made out, and it is expected that the plans for the large lathes, &c., will be completed within about four months, and, after approval by the Board of Ordnance and Fortifications, bids for furnishing the same will be invited. The machines and other fixtures will be completed as soon as the shop is in readiness to receive them, probably about July, 1890. Under the provisions of the Army bill for the procurement of pneumatic dynamite guns the necessary specifications are now being prepared and advertisements for proposals will issue early in December. The guns will probably be of 15 inches caliber and fire a projectile that will carry a charge each of about 500 pounds of explosive gelatine with full caliber projectiles. The guns will probably be delivered in from six to ten months from the date of the contract, so that all the guns of this class that can be procured under the provisions of the law will be purchased during the year 1889.

The business methods of the Navy Department have been improved by consolidating the purchasing of supplies under a single responsible head, so that at the present time about 90 per cent. of the total purchases are made by contract and after competition.

The continued growth and prosperity of the country is in nothing shown more forcibly than the statistics of the Post-Office Department, whose revenues have increased from \$19,772,000 in 1870 to \$52,700,000 in 1888, despite reductions of postage which have enormously reduced rates of revenue while greatly increasing its business. Taken together, the reports present a cheerful record, barring the mischievous tendencies of combined capital, the surplus problem and silver glut.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St. }
PHILADELPHIA, Pa., December 4, 1888. }

Pig Iron.—The market remains in much the same condition as reported for some time past, and, so far as can be seen, is neither better nor worse. But it is very dull, and consumers decline to buy beyond what is necessary to carry them to the end of the year. On the other hand, furnaces are so well sold ahead that they suffer no inconvenience from a period of dullness, which is believed to be only temporary. Local brands of standard quality are unusually scarce, so that as far as they are concerned the chance of lower prices appears to be somewhat remote. Other descriptions can be had in moderate quantities at \$16, \$17 and \$18 at tide for the three grades, and if the demand does not soon improve they may possibly be had at slight concessions from these figures, but as yet the quantity is not large enough to cause serious anxiety on that point. Nevertheless, the market is a waiting one, and likely to be influenced by developments within the next two or three weeks, be they favorable or the reverse. As to the probabilities, it is almost impossible to form any decided opinion. The large and increasing output in the face of a dull market usually indicates lower prices, but in the present instance there is the singular accompaniment of comparative scarcity, firmness and increasing cost of production. Ores are scarce and dear, and likely to be still more so, so that many furnaces it will be impossible to continue making iron, even at present prices, and come out whole. The question of consumption, therefore, is a most important consideration. If consumption can be maintained somewhere near what it has been during the past three months prices of Pig Iron (owing to higher cost, &c.,) ought to advance. Should there be even a slight falling off in consumption, it will be impossible to maintain prices with so many furnaces competing for business. As to the chances for consumption it is not easy to form an opinion. For the next month, possibly for a longer period, there is sure to be some shrinkage, owing to the holidays, stock taking, &c., and whether prices will suffer in the meantime is somewhat uncertain. A large business is considered a certainty in many leading departments, but to steadily absorb at the rate of 7,000,000 tons of Pig Iron a year will not permit any important interest to lag very far behind. Considerations of this kind cause buyers to hesitate, and, for the same reasons, sellers are not inclined to force matters, as chances in their favor may be quite equal to those on the other side. Sales in the meantime are at prices varying from \$16 to \$16.50, at tide, for Gray Forge; \$17 @ \$17.50 for No. 2 Foundry, and \$18 @ \$19 for No. 1. A few favorite brands command a premium of 50¢ @ \$1 per ton, and by the same rule unknown brands or off grades have to be sold at similar concessions, but for standard qualities prices are steady as above quoted.

Blooms.—There is a good demand and sales are on a somewhat large scale at prices within the limits named, varying with analysis, delivery, &c., say: Steel Nail Slabs, \$29 @ \$29.50, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 per "bloom" ton of 2464 lb.

Muck Bars.—The market is easier, and, while there is no great pressure to sell, prices have not been fully maintained.

Good qualities command about \$30, delivered, or for deliveries f.o.b. cars; at mill, \$29 @ \$29.50 is generally quoted.

Bar Iron.—The market has not changed appreciably either way. Mills that were a little short of work have, in some instances, quoted low prices to secure orders to run them during the balance of the month, while others have remained firm at the old prices. There is a great deal of work in prospect, and it is thought that several important orders will be taken in the course of a few days, but there are plenty of bidders at 1.7¢ @ 1.8¢ for good qualities of Bars, and 1.85¢ @ 1.9¢ for the best. The store demand is said to be satisfactory, and, on the whole, the outlook is not discouraging. Car builders are again in the market for large lots, but very low quotations are necessary to catch business of that kind. Skelp Iron is dull, although mills are generally full of work for the present, and additional orders could be had for fair sized lots at 1.85¢ @ 1.87½¢, although sellers ask about 1.95¢ for Grooved Skelp.

Plate and Tank Iron.—The demand is fair, and considering the large amount of work in hand manufacturers ought to feel satisfied. Prices are very unremunerative, however, and in bidding for a good-sized order it is necessary to quote very close figures to stand any chance of getting in. But there is a good deal of small work sent in from day to day, so that the average is perhaps better than appears on the face. Quotations are irregular, but in most cases asking prices are as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.25¢ @ 2.3¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—Reports are a little at variance in this department. Some of the large mills appear to have secured additional orders of considerable importance, while others are doing comparatively little. The fact that prices show weakness and irregularity is pretty good evidence that somebody wants business. Quotations nominally as follows: 2.05¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The heavy demand is about over for the season, so that there is only a retail business for the present. Small lots of best makes are quoted as follows:

Best Refined, Nos. 26, 27 and 28....	3¼ @ 3½¢
Best Refined, Nos. 18 to 25....	3 @ 3½¢
Common, ¼¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28....	4¼ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25....	4 @ 4½¢
Best Bloom Sheets, Nos. 16 to 21....	3½ @ 3¾¢
Blue Annealed.....	2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....	62½ ¢
Common, discount.....	87½ ¢

Merchant Steel.—The demand is not as brisk as it has been, but prices are unchanged, as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—Business continues dull, and, while prices are probably a little steadier, there is not much disposition to place orders at present. It is understood that \$29 at tide and \$29 at Pittsburgh are the prices agreed upon by the Pennsylvania mills, but it is not unlikely that most of the large orders have been placed, so that only a small business can be expected for the present.

Old Rails.—The market is a trifle easier, although the few in store here are held at high figures. Interior deliveries are quoted \$24.50 @ \$25, but the offerings are somewhat larger, so that buyers are less urgent to place orders, and the general position is hardly as strong as it was a little while ago.

Scrap Iron.—Market somewhat easier, as consumers are not buying to any extent, while the offerings are more liberal than they have been. Nominal quotations are about the same as last week, although the feeling is slightly weaker, at the following prices asked: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Nails.—The position does not improve, and while prices are nominally unchanged there are a good many Nails for sale at less than quoted prices, which are from \$1.90 to \$2 for standard makes. Outside lots are offered in carload lots at from \$1.80 to \$1.85, and while they do not meet with much favor they tend to unsettle the market for such Nails as are considered of desirable quality.

Wrought-Iron Pipe.—The market is extremely dull, and to effect sales in quantity very considerable concessions would be necessary. Some of the mills that were unable to make deliveries when the market was in better shape are now overloading the market with goods that ought to have been delivered several weeks ago, hence the weakness. Discounts nominally as follows: Black Butt-Welded, 52½ ¢; Galvanized do., 42½ ¢; Black Lap-Welded, 62½ ¢; Galvanized do., 52½ ¢; Boiler Tubes, 60 ¢.

Mr. Edwin R. Mann, 147 South Fourth street, Philadelphia, has been appointed sales agent for the Acme Low Phosphorus Pig Iron, made at the Norristown Furnace. This Iron is made from special foreign Ores, and is expected to meet the needs of manufacturers of the finest grades of Steel.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington street, CHICAGO, December 3, 1888. }

The condition of trade in numerous lines has been somewhat disappointing during the past week. Hence an outcropping of bearish sentiment is noticeable, and predictions of lower prices are frequent, especially among those whose interests are directly connected with the cruder forms of Iron or Steel. This is traceable not so much to the attempts of manufacturers to force trade as to the shrinkage in the demand. It is argued that if buyers hold off for even a short time there will be such an accumulation of stocks in makers' hands, or such a cleaning up of orders, that manufacturers will make vigorous efforts to secure business, with, of course, the usual result. On the other hand, there are reasons for taking a cheerful view of the situation, which are not wholly disregarded by watchful buyers. This being the time of the year when trade is usually very dull, the present quietude is not particularly ominous. Should it extend into January, good reason for apprehension would then exist. The railroad companies are still buying cars, orders for several hundred having been placed last week, and 2000 more will be purchased this week. The demand for Iron in that quarter will be large. It will be still larger if the Western railroad companies are able to agree upon a plan which will not only put a stop to their reckless competition with one another, but will enable them to establish remunerative freight rates. The effective settlement of the railroad problem would radically change the condition of business in very many branches of the Iron trade. While the situation is unsettled in Crude Iron and heavy forms of Iron and Steel, the reverse

is the case in manufactured products. The manufacturers of Steel goods, such as are handled by the Hardware trade, are getting matters in shape preliminary to an advance in prices. Steel Nail manufacturers, having sounded the lowest depths, now have hopes of better times. The Barb Wire trade will probably be the next to follow. Those in a position to test the course of the current are anticipating an advance in Screws. Another twist upward is to be made in Nuts. As the demand for Hardware is very active at present, these expected advances may be sustained, at least until another dull period intervenes.

Pig Iron.—The volume of business declined last week as compared with the preceding week. An increased quantity of Strong Coke Foundry Pig was sold, and the prospects are bright for considerably larger transactions in that line, but for other kinds the demand was very light. The Calumet Furnace and the remodeled Bay View Furnace were blown in last week to make Pig Iron for the general market, and the prospective addition to the local supply from those furnaces has had a weakening effect on prices, but not decided enough to cause a change in quotations. It is asserted that the Jackson County furnace companies are selling very little, if any, Iron in this market at their advanced price, other Soft Ohio Irons which are available at \$17.50 @ \$18 receiving the preference at the lower rates. Southern Coke Iron is very quiet at present, the higher prices asked for low grades being due to the demand for them in other markets. The large orders expected for Lake Superior Charcoal Iron have not yet been placed, but they cannot be deferred long, in view of the past and prospective orders for cars. Some complaint is made on the score of collections from the general foundry trade, which is an element of discouragement that has quite recently made its appearance. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1 and 2, \$20; Nos. 3 to 6, \$20.50 @ \$21; Alabama Car Wheel, \$26.25; Jackson County Softeners, No. 1, \$18.60; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband), No. 1, \$19.50 @ \$20.50; other Ohio Soft Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$18 @ \$18.50; No. 2, \$17 @ \$17.50; No. 3, \$16 @ \$16.50; Coke Bessemer, \$17.50 @ \$18; Southern Coke, No. 1 Foundry, \$17.25; No. 2 Foundry and No. 1 Soft, \$16.75; No. 3 Foundry and No. 2 Soft, \$16.50; Gray Forge, \$16.

Bar Iron.—More good orders from manufacturing consumers are in the market, including some from car builders. The Pennsylvania Company will open bids for 2000 cars on the 7th inst. The Bar Iron manufacturers are still maintaining a firm front and quote full prices for deliveries next year, but some of them are now offering to make very prompt shipments, showing that they are not so well supplied with work as they have been. They quote 1.72¢ @ 1.75¢, half extras, for Common Iron, f.o.b. Chicago, and ask 50¢ @ \$1 per ton more for Car Iron, although merchants are able to do somewhat better in placing assorted orders. Small lots from store are now selling at 1.90¢ @ 2¢, according to quantity and quality, with stocks in warehouses badly broken.

Structural Iron.—Although plenty of work is in prospect it is taking shape very slowly, so that the past week has been exceedingly quiet. Mill orders can be placed at the following rates, f.o.b. Chicago: Angles, 2.15¢; Universal Plates, 2.20¢ @ 2.25¢; Tees, 2.55¢ @ 2.60¢; Beams and Channels, 3.40¢. Store prices for small lots are unchanged at 2.35¢ @ 2.50¢ for Angles, 2.60¢ @ 2.70¢ for Tees, and 3.80¢ for Beams.

Plates, Tubes, &c.—There is a notable lack of large orders for Plates, but a very active business is still being done in small lots, which are needed for marine repair work. Store prices are very firm. Boiler Tubes are weaker from mill, but with small stocks here prices are well maintained on store lots. Quotations on small lots from store are as follows: Heavy Sheets, Nos. 10 to 14, 2.60¢ @ 2.70¢; Tank Iron, 2.55¢ @ 2.65¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron, 4.25¢; Flange Steel, 3.75¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢. Boiler Tubes, 60 % off.

Sheet Iron.—The demand from store is very heavy, jobbers generally reporting an excellent trade. They quote small lots at 3.10¢ for No. 24; 3.20¢ for Nos. 25 and 26, and 3.30¢ for No. 27. Mill lots are selling on a basis of 3¢ at mill for No. 27, but on large orders or favorable deliveries this price would be slightly shaded.

Galvanized Iron.—Jobbers' stocks are as badly broken as ever, while the demand keeps up from all classes of consumers. Small lots are selling at 60 % and 5 % off on Juniata, and 60 % and 10 % off on Charcoal.

Merchant Steel.—A quiet week is reported in this line. Prices are now very much unsettled in Bessemer Bars, and it is impossible to make a quotation, as each transaction is conducted on an independent basis. Store prices are as follows: Tool Steel, 8.50¢ @ 9.50¢; Specials, 13¢ @ 25¢; Crucible Spring, 3.75¢; Open-Hearth Spring, 2.50¢; Open-Hearth Machinery, 2.40¢ @ 2.75¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—The situation as to prices is not so demoralized as the daily papers allege. The parties in interest will endeavor to sustain the old rate of \$30 here and \$28 at Pittsburgh, and it looks as if they will succeed. Business is not very heavy, but the local mills are picking up small orders every week. Last week they booked something over 5000 tons, mainly for delivery next year. Orders for a considerable quantity are now in the market from the Southwest.

Old Rails and Wheels.—The condition of the Old Iron Rail market is perplexing. A sale of 1000 tons was made to a local consumer at \$23, and another lot of 1000 tons is reported to have been sold at \$23.50. At the same time a considerable quantity has been secured at \$22 @ \$22.50, delivered at Milwaukee, from the Northwest, and the Mahoning Valley mills seem to be able to get a supply of Rails from other points at the equivalent of \$22.50 here. Sellers insist that \$23 @ \$23.50 should be the Chicago quotation, as the supply is limited. Car-Wheels are quiet and nominally quoted at \$19.50.

Scrap.—General business has been very quiet, particularly in No. 1 Forge. Some 200 tons of Mill Iron were sold for \$16, and a large quantity of Mixed Steel was disposed of at \$12.50. Cast Scrap is utterly lifeless. Some strictly No. 1 Railroad Cast was offered at \$14 without takers. Mixed Country Scrap is quoted at \$14 @ \$15. The railroads are offering considerable quantities of Scrap for sale. Dealers' prices for selected Scrap are as follows, per ton of 2000 lb: No. 1 Forge, or Railroad Shop, \$20.50 @ \$21; Track Scrap, \$19.50 @ \$20; Fishplates, \$22; Horseshoes, \$20; Axles, \$26; No. 1 Mill, \$15.50 @ \$16; Pipes and Tank, \$13.50; Light Wrought, \$10; Cast Machinery, \$13.50 @ \$14; Stove Plate, \$11.50; Cast Borings, \$9 @ \$9.50; Wrought Turnings, \$11; Axle Turnings, \$13.50 @ \$14; Coil and Leaf Steel, \$17; Locomotive Tires, \$16.

Hardware.—The demand for Shelf Hardware continues very strong, the

Thanksgiving holiday having made a break merely in interrupting the work of getting out orders and throwing a heavy press of business on the latter part of the week. The demand is very general, but at the same time it is running largely into Shelf Goods. Shot has declined further to \$1.10 regular. No other change in prices worthy of mention has been made, but there is a probability of higher prices in a number of lines. The manufacturers of Steel Goods issued a notice requiring specifications to be sent in before December 1 on all unfilled contracts, or they would be canceled at that time. This is regarded as preliminary to an advance in price. Screws are very firm, and the trade now seems to be in shape to sustain an advance. Nuts are to be marked up very soon. The Tackle-Block manufacturers have also about adjusted their differences, which will correct irregularities in price. Heavy Hardware is quiet and without special feature.

New Car Axles.—The manufacturers of Car Axles have agreed to advance the price of Common Axles to 2.20¢.

Nails.—Heavy quantities of Steel Nails are now being sold by the manufacturers whose prices come nearest to buyers' views, and jobbers here and at points further West are laying in good stocks. As far as can be ascertained manufacturers are refusing to quote on deliveries next year, but are only selling for immediate or early shipment. It is reported that arrangements will probably be completed by the middle of the month for a combination of the Wheeling and other Ohio River manufacturers, when prices will be advanced. A guarantee fund is to be put up by each manufacturer, to be forfeited in case of cutting. The Wheeling manufacturers have given up for the present the hope of establishing a national pool, and, as the bulk of the Steel Nails produced in the country are made in the Ohio River Valley, they will try the experiment of controlling prices there, in the belief that some benefit can thus be obtained. Prices now are undoubtedly below cost, and this is a very good time to arrange for an advance in anticipation of the spring demand. The Chicago and Southern Illinois manufacturers have agreed to co-operate with the Ohio River manufacturers in sustaining prices, although they have not joined the combination. They are heartily tired of the unsatisfactory situation of the Steel-Nail trade, and assert their intention to do their utmost to improve it. Small lots of Steel Nails are still being sold at \$1.95 @ \$2 from store, and \$1.90 for carloads on track, but large lots are 10¢ lower. Wire Nails are a shade lower, being now obtainable at \$2.55 in small lots, but if Steel Nails advance they will also firm up again.

Barb Wire.—The demand is a little better. A noticeable feature of the current business is the occasional receipt of an order for a considerable quantity from merchants who write that they are buying it not to meet their immediate wants, but because they consider it cheap, and therefore good stock to hold until the spring demand sets in, if, indeed, the manufacturers do not advance the price in the meantime, in which case the purchase will be a still better one. Some manufacturers are already asking a better price, believing that the outlook warrants it. Small lots are unchanged at 2.90¢ for Painted and, 3.60¢ @ 3.65¢ for Galvanized, with the usual difference for carloads.

Pig Lead.—This market has been very active for the past few days. Over 900 tons of Common and Corroding Lead were sold to consumers for delivery this month and next, at prices ranging from 3.42¢ to 3.55¢ at the close, the greater portion going at 3.50¢.

Geo. S. Hall & Co. succeed W. S. Kessler & Co. as Western sales agents of the Toledo Bolt and Nut Company. Their office will continue to be at 115 Dearborn street, Chicago, Room 53. Mr. Hall was formerly a partner of Mr. Kessler, who has retired from this firm to engage in another line of business.

B. L. Keen & Co., manufacturers' agents for the sale of Bar Iron, Steel, Beams and Channels, Railway Supplies, &c., have removed from 184 Lake street to Room 545, Rookery Building, Chicago.

The Allegheny Bessemer Steel Company, of Pittsburgh, have appointed B. B. Kerr Western agent for the sale of their Steel Rails. Mr. Kerr is well acquainted with the railway fraternity, having been connected with Pettibone, Mulligan & Co., of Chicago, for the past six years, handling railway supplies. His office for the present will be located at 243 Lake street, Chicago.

The Chicago Crucible Steel Casting Company have established city offices in a fine suite of rooms on the second floor of 154 and 156 Lake street, Chicago.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts.,
CINCINNATI, December 3, 1888.

Pig Iron.—The tenor of the local Pig-Iron market has changed but little during the week under review, but there has been a less heavy business, although the market has been by no means dull. A strong tone has prevailed and full prices have been realized. Southern furnaces, being so largely sold ahead, have figured less prominently, while Ohio and Pennsylvania Irons have sold more readily. The curtailment of production to some extent in Jackson County Irons has resulted in higher prices for some grades. The demand has continued to be largely for Mill grades, but there have been larger inquiries for Car-Wheel, Mottled, White and "off" grades of both Mill and Foundry make. Some of the local houses have experienced during November the heaviest month of their history, but this has been due to exceptional conditions and is not indicative of the trade at large, but reflects rather the entrance of new capital into the Iron interest. Among the sales have been 1200 tons Southern Car-Wheel Iron for delivery next year at the rate of 200 tons per month at outside quotations. Sales of Mill grades are reported in lots of 700, 3000, 1000, 2000 and 500 tons, and Foundry grades in lots aggregating 4000 tons. One contract for 12,000 tons Cold Forge Iron is about to be closed to-day between \$14.25 and \$14.50 per ton. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Foundry.

Southern Coke, No. 1 (new classification).....	\$16.25 @ \$16.75
Southern Coke, No. 2 (new classification).....	15.50 @ 16.00
Southern Coke, No. 3 (new classification).....	15.00 @ 15.25
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	18.00 @ 18.50
Hanging Rock Charcoal, No. 1.....	21.00 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.....	17.50 @ 18.00

Forge.

Strong Neutral Coke.....	15.00 @ 15.25
Mottled Neutral Coke.....	14.00 @ 14.25
Gray Forge.....	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 25.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	21.00 @ 22.00

Old Material.—There has been a little stronger tone prevailing for both Old Rails and Wheels under moderate offerings, and

a better demand; 400 tons Old Rails sold at \$19, cash, here and Old Wheels have sold at \$23, spot, cash.

Manufactured Iron.—There has been a fair volume of business during the week and a firmer tone has prevailed. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ per lb.

Nails.—The market has remained steady, with a moderate jobbing trade. Jobbing prices are based upon 12d @ 40d, which sell at \$1.95 per keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$1.95 and Steel Wire Nails at \$2.65 per keg.

Louisville.

LOUISVILLE, KY., December 3, 1888.

Pig Iron.—The market has been quiet during the week, and sales only in small quantities have been effected. There is a disposition to make slight concessions to buyers for large quantities, and it is thought that prices will improve after the first of the year, as at present there are few buyers who desire to make purchases for future delivery until after they have taken stock and this year's business is closed up. We think the weakness of the market is attributed to the close of the season rather than to large quantities of Iron being offered, as Southern furnaces are well sold up, and very little Iron is offered by furnaces that were expected to have been in blast before this. We quote as follows:

Southern Coke, No. 1 Foundry, new classification.....	\$16.50 @ \$17.00
Southern Coke, No. 2 Foundry, new classification.....	16.00 @ 16.50
Southern Coke, No. 3 Foundry, new classification.....	15.50 @ 16.00
Gray Forge.....	15.00 @ 15.50
White and Mottled, different grades.....	14.00 @ 14.50
Silver Gray, different grades.....	15.50 @ 16.50
Southern Charcoal, No. 1 Foundry.....	17.75 @ 18.25
No. 1 Mill.....	16.00 @ 17.00
Southern Car-Wheel, standard brands.....	22.75 @ 23.75
Southern Car-Wheel, other brands.....	19.00 @ 21.00
Hanging Rock Coke, No. 1 Foundry.....	17.00 @ 17.50
Hanging Rock Charcoal, No. 1 Foundry.....	20.75 @ 23.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Hanging Rock, Warm Blast.....	19.00 @ 20.00

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, December 4, 1888.

The general Iron situation remains much the same as noted in our report of a week ago. December is usually a dull month, when buying is done sparingly, so that the year may be closed with as little stock as possible.

Pig Iron.—A fair degree of activity prevails, although there is not the volume of business there was some time ago. Consumers generally are pretty well covered for the rest of the present year, and furnacemen are well sold up; some of them will be off the market not only for this month, but for two or three months, having contracts sufficient to absorb their entire production during that time. It is intimated, however, that there is a disposition on the part of some furnacemen to talk bearishly in order to beat the Ore market, as the time is now approaching when it is customary with many of them to make contracts for Ore; it is not uncommon for some furnacemen to contract in January for a year's supply of Ore to be delivered along as they need it, and they strive to get the market for Ore down to the lowest point possible before they buy. It is doubtful whether as large contracts for Ore will be made as formerly. It is probable a good many furnacemen will feel more like buying as they need it in preference to contracting for a six or twelve months' supply. However this may be, some fur-

nacemen are refusing to contract for future delivery at present time, and the outlook generally warrants the belief that there will be a good healthy market for some time to come. We quote prices for immediate or near-by delivery as follows:

Neutral Gray Forge.....	\$15.75 @ \$16.25, cash.
All Ore Mill.....	16.75 @ 17.00, "
White and Mottled.....	15.00 @ 15.25, "
No. 1 Foundry.....	18.00 @ 18.50, "
No. 2 Foundry.....	17.00 @ 17.50, "
No. 3 Foundry.....	16.50 @ 16.75, "
No. 1 Charcoal Foundry.....	23.50 @ 24.00, "
No. 2 Charcoal Foundry.....	21.00 @ 22.00, "
Cold Blast Charcoal.....	25.00 @ 28.00, "
Bessemer Iron.....	17.25 @ 17.50, "

Included in the sales reported were several thousand tons of Gray Forge at \$16, cash, 1000 tons at \$15.75, cash, and some smaller lots at \$16.15 @ \$16.25.

Muck Bar.—There is still considerable inquiry for immediate delivery, and, with but little offering, the market may be quoted at \$29 @ \$29.50, cash, with a sale of 1000 tons reported on January delivery at \$29.60, cash. So far as your correspondent can learn there have been no actual sales above the prices quoted.

Spiegel.—Is quoted at \$27.50 @ \$28 for 20%, cash, and Ferromanganese at \$56.50 @ \$57, cash, for 80%.

Manufactured Iron.—The demand is not as active as it was a month or more ago, but the mills are still pretty fully employed in working old contracts. There is not the inquiry for Skelp Iron that there has been, but it always drops off this month, if not before, and the effect will be to increase the capacity for making Merchant, as those mills making a specialty of Skelp and doing but little else since early in the summer will now be wanting orders for any kind of Iron they can make in order to keep their mills going. Prices remain as last quoted: Bars, 1.80¢ @ 1.85¢; Plate, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢; all 60 days, 2% off for cash. Skelp Iron is weaker, but may still be quoted at 1.85¢ @ 1.90¢ for Grooved, and 2.10¢ @ 2.12½¢ for Sheared.

Nails.—There is no improvement to report in the Nail trade, and not likely to be until toward spring. Pittsburgh manufacturers are still asking full card rates upon a basis of \$1.90 for 12d @ 40d, 60 days, 2% off for cash, but they are not able to effect sales, nor is it to be expected, as long as they can be bought from 25¢ to 30¢ less per keg elsewhere. Pittsburghers say they prefer to let their factories stand idle to running them at a loss, and they claim that even at the full card the margin for profit is small. In regard to the price for the 10,000-keg order recently placed in the Wheeling district, we learn authoritatively that it was \$1.66, net, cash, showing that the report made in regard thereto in *The Iron Age* two weeks ago—\$1.65 net, cash—was not far from the mark.

Wrought-Iron Pipe.—The demand continues light, as it always is at this particular time, and no improvement can reasonably be looked for until toward spring; trade is nearly always light during the winter season, and the Pipe mills will no doubt curtail their production considerably for some time to come. Prices remain unchanged. Discounts on Black Britt-Welded Pipe, 52½¢; on Galvanized do., 45¢; Black Lap-Welded, 62½¢; on Galvanized do., 52½¢; Boiler Tubes, 60¢; 2-inch Tubing, 13¢ per foot, net; 5½-inch Casing, 40¢ per foot; all in large lots.

Old Rails.—Sales of American Tees at \$25 @ \$25.25, at which price the market is fairly active and steady. Now that the cold weather has set in the work of lifting will soon be very much curtailed, if not suspended, and a firmer market is not unlikely.

Steel Rails.—Heavy sections are still quoted at \$28 @ \$28.50, cash, at mill, and while the market is reported firmer it is said that there is no difficulty in placing desirable orders at \$28. The new mill of the Allegheny Bessemer Steel Company will not be ready to start for some time to come, although the company have booked some orders.

Billets, &c.—Bessemer Steel Billets are quoted at \$28.50 @ \$28.75, cash, at makers' mill, and ditto Nail Slabs at \$28 @ \$28.25. Some of the mills, including Carnegie, Phipps & Co. and Park Bros., have large contracts for Ship Plates. Domestic Rail Crops may be quoted at \$19.50 @ \$20; sale of 1000 tons Domestic Bloom Ends at \$19.50.

Railway Track Supplies.—Spikes are still quoted at \$2.20, 30 days, but this, we believe, means delivered where the freight rates do not exceed 10¢ @ 15¢ per 100 lb; brokers report sales at 2.05¢ f.o.b. cars, Pittsburgh. Splice Bars remain unchanged at 1.85¢ @ 1.90¢, and Track Bolts at 2.85¢ with square, and 2.95¢ with square and hexagon Nuts.

Old Material.—There is a fair business, but prices remain unchanged. Sales No. 1 Wrought Scrap at \$21 per net ton; Wrought Turnings, \$18 @ \$14; Car Axles, \$25.50 @ \$26.50; Old Car-Wheels, \$20 gross; Cast Scrap, \$15.50 @ \$16. Sales short pieces Steel Rails at \$18.50; Open-Hearth Scrap Steel, \$18.50 @ \$19.25.

Naylor & Co., of 99 John street, announce that they have opened an office in the Lewis Block, where they will receive inquiries and orders for domestic as well as imported Iron, Steel and Metals. They suggest that their customers west of the Allegheny Mountains correspond with their Pittsburgh office.

Detroit.

WILLIAM F. JARVIS & Co., under date of December 3, report as follows: The market is more active than it has been for the past month, and a number of buyers are casting about for round lots of Car-Wheel and other grades, but sellers are generally holding firm at present prices and there is a strong upward tendency. There is usually an active trade in December, and from the inquiries received from different parts of the country it looks as if this month would be an exceptionally good one. Numerous small orders have been placed, and some of considerable magnitude. Car-Wheel Irons are most in demand, but a good trade is being done in the best brands of Mahoning Valley Coke Iron, with a few good sales of Southern. We report an active market and quotations as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.75 @ 20.25
Lake Superior Coke, cinder mixed.....	18.50 @ 19.00
Standard Ohio Black Band.....	19.75 @ 20.25
Southern No. 1.....	17.75 @ 18.25
Southern Silvery.....	17.00 @ 17.50
Southern Gray Forge.....	16.25 @ 16.75
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	20.50 @ 21.50

New York.

Office of *The Iron Age*, 66 and 68 Duane street, New York, December 5, 1888.

Pig Iron.—The local market is without any new features, except that consumers are, on the whole, showing considerable apathy, while some sellers are not quite so confident as they have been lately. On the whole Southern furnacemen are those who are most enthusiastic on the future, and are acting up to their convictions by declining to sell for longer delivery than the first quarter of 1889 at any notable concessions. Some agents report that they are making deliveries now which were delayed in the past, when they substituted other Irons. Our blast-furnace returns are

not yet sufficiently complete to enable final figures to be presented thus early in the month, but the reports thus far indicate a further increase. Among the furnaces which have blown in during November and early in December we may name two Hudson, one Troy, in New York; Union, in the Upper Susquehanna district; a second Allentown, in the Lehigh Valley; Mount Laurel, in the Schuylkill Valley; Spearman and Stewart, in the Shenango Valley; the new Cameron, at Emporia, Pa.; the second Cherry Valley, in Ohio; Akron, one Floodwood and one Fannie, in the Hocking Valley; one Union and Calumet, in Chicago; the remodeled Bay View, at Milwaukee; a third Ensley, at Birmingham and No. 3, South Pittsburgh, Tenn. Merion and Montgomery, in the Schuylkill Valley, are to blow in soon, and the first of the famous new plant of the Pennsylvania Steel Company, in Maryland, is soon to be ready. Against this we can only enumerate the blowing out of one of the Lock Ridge furnaces of the Thomas Iron Company; of one of the Bethlehem plant; of the Lebanon Valley, which is to resume on the 18th of this month, and of one of the Bird Coleman furnaces. We continue to quote Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is weaker. We quote: Coltness, \$21, nominally; Shotts, \$20.25 @ \$20.75; Langloan, \$20.50 @ \$21, and Dalmellington, \$19.50 @ \$20.

Spiegeleisen.—We quote nominally \$27 for German 20 % Spiegeleisen, and \$54 for Ferromanganese, 80 %, prompt delivery.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.6¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—It is reported that very low prices are being made by at least one Western producer in Plates and Structural Iron and Steel, with the exception of Beams, the evident purpose being to keep a large capacity employed. Still, there is considerable work coming up, one Eastern mill reporting that in one day they put in bids for \$450,000 of bridge work. We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢. Foreign Beams are 2.65¢ @ 2.75¢.

Bar Iron.—We quote: Carload lots, half extras, Common; 1.70¢ @ 1.75¢; Medium, 1.75¢ @ 1.8¢; Refined, 1.8¢ @ 2¢.

Steel Rails.—The situation is not quite clear. There have been no large sales in the East which may serve as the basis of quotations, nor is there any business of any consequence in sight. The Eastern mills are cut out of the Western market entirely, and while low prices are being made in the West, they are being underbid in the South, which is the only territory of any consequence in which they can hope to place much tonnage. Facts are constantly cropping up which prove how low prices went two weeks since. Thus, a large order was placed for delivery at Omaha at \$30.50, which would be equivalent to about \$25 at Pittsburgh. In the last week sales have been made by Pittsburgh and Chicago mills, aggregating about 30,000 to 35,000 tons, and additional orders are in the market, including a large block for a Southwestern system. The prices at which these sales were made are not given out, but it is claimed that an advance over the lowest was realized. The reports of an agreement among the Western mills are without any foundation, the only fact giving color to it being the alliance of the Chicago mills, which will have the good effect, at least, of narrowing down the

number of contestants. To this must be added the fact that for the present, at least, the new Pittsburgh mill has withdrawn from the market on everything but small lots for convenient delivery. As many large orders have been taken by it as its managers deem expedient until they know definitely when they will again work, and how soon they will overcome the hitches which invariably accompany the starting of any great manufacturing plant. The personal element enters so largely into shaping the policy of the near future, so far as the Western mills are concerned, that any moment may bring the demoralization to a close, if in fact that time has not already come. It is asserted that to-day \$29 is the bottom at Chicago, and \$28 at Pittsburgh, and it is possible that some of the quotations cited to controvert that statement were made prior to last week. The losses entailed by the low figures at which Rails have been sold are so heavy that they are not likely to rule long in any case. They may or may not be a thing of the past before this report reaches our readers. It should be remembered that the number of active competitors has narrowed down very considerably. Four Eastern mills and two Western concerns are turning their Steel product into other channels, two mills have booked enough Rails to keep them out of the market for the present, and two are entirely idle. We discuss the situation editorially.

Slabs and Billets.—Although there has been a slight weakening in Slabs and Billets, it has not been so much as may have been expected in view of the recent demoralization in Steel Rails.

Merchant Steel.—Well authenticated reports indicate that the prices fixed by the Merchant Steel Association have been sharply cut, and that the combination is practically inoperative. Agricultural and Merchant Steel have been sold at low prices for 1889 delivery.

Old Rails.—Outside of one sale of 700 tons at private terms there has been no business. We quote, nominally, \$23.25 @ \$23.50.

Financial.

Cuts in railroad tariffs, gold exports, a decreasing bank surplus and contradictory reports respecting conferences among railroad managers have had an unsettling effect in monetary circles, and have not been without their influence in some departments of business. The prevailing feeling is the improbability of an early adjustment of differences respecting freight charges, owing to the refusal of railway lines in the Northwest to enter into the clearing-house plan favored by several of the Southwestern roads. Nevertheless, there are signs of progress. The railroads that are members of the Central Traffic Association were notified on Monday that on December 17 they must, in accordance with action taken by the association at Chicago on Saturday, advance rates on east-bound freight to a basis determined by an advance in the rates between Chicago and New York, as follows: Grain, from 18¢ to 25¢ per 100 lb; provisions, 25¢ to 30¢; live stock, 15¢ to 22½¢, and dressed beef, 35¢ to 50¢ per 100 lb. The Grand Trunk is allowed a differential rate of 45¢ per 100 lb on dressed beef via Montreal, the Chicago and Atlantic also a 45¢ rate, and the Wabash and "Nickel Plate" roads a differential of 48¢ per 100 to New York and Boston. It is understood that this advance will be followed by a restoration of west-bound rates to the figures that were scheduled before the New York Central made its wholesale reduction two weeks ago, but respecting this last supposition there is room for conjecture. Nor is there much hope of relief from the Interstate law.

The Transcontinental Association before adjourning agreed upon a system of graded rates on the traffic to the Pacific Coast. The highest class differential rate in favor of Chicago will be 3¢ less than from New York, while the lowest class rate will be 10¢ less. The St. Louis rate will be 99 % of the Chicago rate; Missouri River rates, 60 %; Buffalo and Pittsburgh, 20¢ less than New York on first class and 5¢ on the lowest class; Cincinnati, Toledo and Detroit, 25¢ less than New York on the highest class and 5¢ on the lowest. Commissioner Fink said that, with the exception of a few details that remained to be arranged, all matters connected with fixing the rates have been practically settled.

Weakness in the Stock Exchange markets was more pronounced. On Friday Lake Shore was a prominent feature, in anticipation of the agreement to advance rates on Eastern business. An unfavorable influence was a sharp break in copper stocks. On Saturday, despite the improved trunk line situation then announced, a selling movement carried the whole list downward. The free sales were attributed to reported difficulties in the Southwest, arising from failure to obtain the assent of a majority of stockholders in the various lines to the clearing-house plan. On Monday there was a drop in Atchison, Topeka and Santa Fé, also a break in New England, coupled with reports of financial trouble in Boston, and the coal shares were weak, owing to orders for restricted production at the mines. On Tuesday a fall in Atchison, Topeka and Santa Fé and in Missouri Pacific had an unsettling effect and the market became feverish. The injunction suit of the Oregon Transcontinental Company against the Oregon Navigation Company was decided in favor of the plaintiff. This decision compels the cessation of construction on the part of the Oregon Railway and Navigation Company and the Union Pacific of lines in Washington Territory competing with the Northern Pacific.

According to the Custom House report the exports of specie from this port during the week were \$2,333,000; total since January 1, \$38,065,000, of which \$12,000,000 is silver, as compared with \$16,988,000 for the same time in 1887. The imports were \$142,000, and since January 1 \$6,989,000, against \$39,283,000 for the same time last year.

The imports of merchandise at this port during the week amounted to \$7,841,000, and the total since January 1 is \$427,761,000, as compared with \$432,979,000 for the same time last year. The exports were valued at \$6,288,000, and included 56,000 packages flour, 586,000 bushels of corn, 31,400 bales of cotton and 10,500,000 gallons of oil. Total exports since January 1, \$274,871,000, against \$287,977,000 for the same time last year.

Government bonds were dull but firm. Quotations as follows:

U. S. 4½, 1891, registered.....	108
U. S. 4½, 1891, coupon.....	108
U. S. 4, 1907, registered.....	127½
U. S. 4, 1907, coupon.....	128½
U. S. currency 6s.....	118

The gross exchanges of 40 cities for the week ended with December 1 showed a decrease of 17.5 % compared with last year. Outside of New York the decrease is 14.4 %. New York decreased 19.1 %, Boston, 7.7 %, Philadelphia, 21.1 %, Chicago, 27.5 %, St. Louis, 18.9 %, San Francisco, 14.2 %, Baltimore, 19.1 %, Cincinnati, 11.8 %, New Orleans, 25.4 %, Duluth, 50.2 %, and Los Angeles, 56.2 %. Kansas City increased 12.4 %, Memphis, 28.9 %, and Topeka 29.1 %. The clearings of 37 cities for the month of November decreased 4.5 %.

In the general markets trade was slow, but, allowing for holiday interruption, the volume of business was fair. On the Produce Exchange prices were inclined to

drop. A break in spot wheat on Monday of 2½¢ a bushel, caused by a large increase in the visible supply, was followed by depression in breadstuffs, and there was more export at the decline. Lisbon took out of this market on Friday 72,000 bushels wheat, the first export trading of consequence in a long while. Foreign markets are still 5¢ @ 10¢ below New York. Cotton was unsettled, with sales of spot limited to special orders. Coffee tends upward, with some excitement. Provisions are irregular, as packers are hammering the market. A new lard refinery in this city is talked about. Dry goods jobbers notice a fair demand; prices generally firm. The result of the action of the Liverpool Salt Trust in advancing prices about 25¢ per sack is lighter importations here on fresh purchases. The weekly bank statement showed a decrease of \$2,235,325. This makes the surplus now held \$10,076,550, against \$5,845,725 at the corresponding time last year and \$6,165,950 in the first week of December, 1888. In spite of the heavy decrease in the reserve the comparison with the figures of preceding years is still favorable. The loans show a gain of \$590,200; specie is decreased \$4,872,900; the legal tenders are up \$1,643,200. The money market has been free from disturbance and the ruling rate on call is still 2½ %. The demand is comparatively limited owing to dullness in the speculative markets. The currency movement also tends to keep rates low. There was a marked falling off in the exports of specie and exchange on London weakened. A favorable indication is the increasing exports of cotton. The interest payments December 1 on \$570,608,963 of bonds amounts to \$14,972,327, and the dividend payments on \$337,609,628 of stock amounts to \$6,228,855; total payments, \$21,201,182, for an off month.

E. E. Gedney was appointed to the presidency of the North River Bank to succeed Levi Appar, deceased, and Daniel Barnes succeeds the late Henry P. Marshall as cashier of the Seamen's Bank for savings.

The Empire State Bank, James W. Conron, President, corner of Broadway and Bleecker street, commenced business yesterday.

Coal Market.

The Anthracite Coal trade is dull in wholesale lines, as little eagerness to buy is manifest in the presence of ample supplies. The Coal producers, in deciding between the alternatives of lower prices or lessened production, are resolved to restrict the output at the mines, beginning December 1. The Reading Coal and Iron Company, on Saturday, shut down some 18 collieries, besides reducing the working hours at the others to three-quarters time. At a meeting of sales agents in this city, on Tuesday, while no formal action was taken, probably for prudential reasons, a tacit understanding is supposed to have been reached, recognizing the necessity for restriction. Contrary to anticipations, the production for the week ending December 1 is only 50,000 tons less than for the previous week, scarcely reflecting the Thanksgiving-day interruption, the total being 780,015 tons, as compared with 770,845 tons for the corresponding week last year. The aggregate since January 1 is 35,528,753, against 31,981,628 for the same time in 1887, an increase of 3,545,000 tons. Quotations remain as before, but actual sales are said to range from 25¢ to 50¢ below the schedule: Hard White Ash, Lump, \$4.50; Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Free-Burning, f.o.b., Broken, \$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.65; Pea, \$2.75.

Bituminous Coal is in good supply, only temporary embarrassment having been caused by the loss of Coal-laden barges in the bay, and prices are still based on the pool figures, \$3.25, f.o.b. Cumberland reports for the week 76,522 tons and Clearfield 78,700 tons.

The Pennsylvania Railroad reports for the week 252,000 tons of Coal and 99,867 tons of Coke. Reading's shipments were 166,000 tons, of which 58,000 went to Port Richmond and 7000 to Port Liberty.

A new railroad is projected between Scranton and Forest City, 22 miles long, designed to connect with the line at Binghams, and is understood to be backed up by the Central New Jersey and Lehigh Valley railroads. The Delaware and Hudson Canal Company broke ground for a new mine in Forest City on Monday.

Freights to Boston are quoted \$1.101, with less demand.

Metal Market.

Copper.—The London market has again come lower since our last week's report, spot Chili Bars declining from £77. 17/6 to £77. 10/, futures from £78. 5/ to £78, and good merchantable brands from £77. 17/6 to £77. 10/ for spot, futures being £78 and Best Selected £82. Sales, 550 tons. The fire which broke out at the eighth level of No. 3 shaft of the Calumet and Hecla mine on the morning of November 30 was at latest accounts still burning, but even if the stoppage at that point be long the decrease in production will probably not exceed 10,000,000 to 15,000,000 lb during a twelvemonth, hence the little effect this incident has exercised in England and here. The visible supply in England and France is, indeed, swelling so fast that it overshadows everything, being on December 1 95,790, against 91,740 tons on November 1 and 45,130 on December 1, 1887. Adding to the above the about 30,000 tons accumulation of Copper on this side, including large stocks at New Orleans, and it will be seen that some 120,000 to 125,000 tons are thus set aside to maintain prices. And this at a moment when the Panama Canal Company seems to be breaking down and causing great uneasiness in financial circles in Paris. Later advices from the Calumet and Hecla are more reassuring; the temperature at the surface is decreasing and an early resumption of work expected. It appears that a pool sale was made by the syndicate to manufacturers for a three months' supply from January 1 next at a price not transpired, but supposed to be 16½¢. Our market has meanwhile been 'dull at 17½¢ Lake, nominally, in the open market, and 16¢ @ 16½¢ casting brands. Accounts from Germany are to the effect that the Brass manufacturing branch suffers considerably from the high price of Copper. Perhaps the Brass works of M. Secrétan of the syndicate also interfere at their lower Copper prices with their other Continental competitors, and it is stated Brass goods from that source also begin to be imported here, a gloomy prospect for our manufacturers should the syndicate possess greater longevity than many suppose. The import into Liverpool and Swansea from the United States the first 10½ months has been 21,465 tons fine, against 12,864 tons last year.

Tin.—The statistics are so unfavorable just now that a break has occurred both in London and here. On December 1 the visible supply in Europe and America was 12,478 tons, against only 11,913 on November 1 and 14,058 on December 1, 1887. London gave way in consequence from £100. 17/6, spot Straits, to £99. 10/, and futures from £101. 10/ to £100. Sales, 260 tons. Here 20 tons spot sold from 22.25¢ down to 22¢; 10 tons March

at 22½¢, and 10 January at 22.10¢. *Tin Plates*.—The demand has been moderate only for spot goods, and prices are a shade easier. A good many orders and inquiries have been cabled to the other side, but in most cases business has not resulted, the makers' order books being tolerably well filled for the next three months. We quote at the close, large lines, per box: Siemens-Martin Steel, Charcoal Finish, \$4.85 @ \$5.75; ditto, Coke Finish, \$4.70; Terns, \$4.05 @ \$4.25; Bessemer Cokes, \$4.25 @ \$4.35; and Wasters, \$4.15. Liverpool comes 13/3 @ 13/6.

Lead—Has been gradually looking up again, because the available supply for consumptive purposes at this point is momentarily well held and not overabundant. Some 300 tons Common Domestic were taken at 3.70¢ @ 3.75¢, and at the close 3.80¢ @ 3.85¢ is asked, while 3.75¢ is offered. St. Louis is 3.50¢ @ 3.55¢. In London Soft Spanish is steady at £13. 2/6, and English Pig at £13. 5/.

Spelter.—Nothing of special interest has occurred in our own market, which has been dull at 5¢ @ 5½¢ for Common Domestic, and Silesian, nominally, 5½¢. London gave way with the latter to £17. 17/6. The rumors about a new German-Belgian syndicate amount to nothing. The International Syndicate expires on July 1, 1889, when it may possibly be renewed for five years, but this will only come up for consideration next spring.

Antimony—Has continued strong at 12½¢ @ 13¢ for Cookson and 10½¢ @ 11¢ for Hallett; the demand is good and the stock light. Hallett remains unaltered, £44, in London.

New York Metal Exchange.

The following sales are reported:

SATURDAY, December 1.	
10 tons Tin, spot	22.25¢
10 tons Tin, March	22.50¢
MONDAY, December 3.	
16 tons Lead, March	3.80¢
TUESDAY, December 4.	
10 tons Tin, January	22.10¢
10 tons Tin, spot	22.00¢

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from November 23 to November 30, inclusive, and from January 1 to November 30, inclusive, were as follows:

Iron and Steel.		Nov. 23 to Nov. 30.	Jan. 1 to Nov. 30.
		Tons.	Tons.
Pig Iron: Crocker Bros.	485	14,222	550
R. F. Downing & Co.	250	14,350	1,105
G. W. Stetson & Co.	200	2,053	11,732
G. T. Carter	200	100	420
Spiegeleisen: C. L. Perkins	301	15	11,797
Naylor & Co.	300	60	280½
N. S. Bartlett	100	58	688
Geisenheimer & Co.	100	33	1,421
Crocker Bros.	100	13	845
Steel: R. F. Downing & Co.	60	11	246
Oelrichs & Co.	58	7	225½
W. F. Wagner	33	6	500
R. H. Wolff & Co.	13	8	588
M. Cohn	11	300	18,807
C. F. Boker	7	223	6,084
F. S. Pilditch	6	101	101
J. Abbott & Co.	8	98	3,800
Steel Rods: Naylor & Co.	300	31	1,068
Dana & Co.	223	14	529
E. S. Wheeler & Co.	101	10	69
R. H. Wolff & Co.	98	349	2,515
Steel Sheets: Pierson & Co.	31	90	90
Naylor & Co.	14	251	251
Williams & Whitney	10	20	83
Steel Blooms: Naylor & Co.	349	200	315
Steel Hoops: Bullard & W.	90	125	7,353½
Steel Wire Rods: J. Abbott & Co.	251	152	200
Co.	20	51	117
Cary & Moen	20	35	1,374
Iron: R. F. Downing & Co.	200	85	490
J. Abbott & Co.	125	85	623
A. Milne & Co.	152	32	32
Iron Rods: Naylor & Co.	51	13	774
Wire Rods: R. F. Downing & Co.	51		
Sheet Iron: T. B. Coddington & Co.	35		
Swedish Rough Bars: C. v. Philp	85		
Swedish Bar Iron: C. v. Philp	85		
Swedish Bar Ends: Naylor & Co.	32		
Charcoal Iron: Naylor & Co.	13		

Iron Girders: R. F. Downing & Co.	30	588½
Swedish Wire Rods: C. v. Philp	51	55
Swedish Bessemer Steel Ingots: C. v. Philp	60	60
Oil Barrel Hoops: G. W. Sheldon	200	200

Tin Plates.

	Boxes.	Boxes.
T. B. Coddington & Co.	4,089	162,987
Phelps, Dodge & Co.	1,833	524,486
N. L. Cort & Co.	1,764	106,216
A. A. Thomsen & Co.	1,705	143,952
Pratt Mfg. Co.	442	158,891
Bruce & Cook	375	92,823
Merchant & Co.	362	22,912
Jas. Byrne & Son	247	38,601

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.	448,979	11,718,484
Phelps, Dodge & Co.	112,003	3,749,825
Naylor & Co.	111,919	3,663,403
Spelter: Naylor & Co.	78,234	551,147

	Casks.	Casks.
Antimony: Phelps, Dodge & Co.	50	680

Irons and Metals Warehoused from November 23 to November 30, inclusive:

	Tons.
Swedish Iron: J. Abbott & Co.	101

Hardware, Machinery, &c.

Baker, Hermann & Co., Mdse., cs., 12	
Buchanan & Lyall, Mach'y, cs., 4	
Field, Alfred & Co., Mdse., cs., 3	
Folsom Arms Co., Mdse., cs., 3; Arms, cs., 4	
Frasce, P. A. & Co., Mdse., cs., 3	
Graef Cutlery Company, Cutlery, cs., 4	
Schoverling, A., Arms, cs., 6	
Schoverling, Daly & Gales, Arms, cs., 28	
Taylor, Thos., Mdse., cs., 5	
Thebaud Bros., Mach'y, pkgs., 14	
Wiebusch & Hilger, Lim., Mdse., cs., 12	
Order: Mach'y, cs., 2; ditto, pkgs., 24	

Exports of Metals.

	Nov. 23 to Nov. 30.	Jan. 1 to Nov. 30.
	Pounds.	Pounds.
Copper: J. Abbott & Co.	13,182,530	
Lewisohn Bros.	4,041,522	
F. A. Lomal	2,581,233	
American Metal Company	6,018,291	
G. H. Nichols	223,939	
J. Bruce Ismay	112,000	
S. Mendel	560,000	
Ledoux & Co.	110,278	
Muller, Schall & Co.	430,000	
Copper Queen Con. M. Company	224,034	
J. Kennedy, Tod & Co.	112,028	
H. Becker & Co.	1,250	
Orford C. & S. Rfg. Company	449,881	
Robt. M. Thompson	125,000	
Thos. J. Pope, Sons & Co.	1,451,130	
Williams & Terhune	99,320	
J. Parsons & Co.	420,000	
Naylor & Co.	448,809	
Bridgeport Copper Company	112,000	
C. Herold	250,000	
Phelps Bros.	6,250	
R. W. Jones	189,984	
Ladenburg, Thalmann & Co.	229,371	
W. H. Crossman & Bro.	4,000	
R. Crooks & Co.	1,000	
Copper Matte: Williams & Terhune	724,790	37,852,539
Lewisohn Bros.		3,021,610
American Metal Company	149,811	4,964,830
J. Abbott & Co.		337,447
C. Ledoux & Co.		989,800
F. W. J. Hurst		184,288
G. H. Nichols		722,777
H. T. Nichols & Co.		180,996
Kunhardt & Co.		41,652
Copper Ore: Williams & Terhune	176,960	1,252,156
American Metal Co.	14,500	357,500
Lead: Joseph Gillet	661,920	2,248,015

Notwithstanding all that has been said against the great Eiffel Tower, at Paris, the work is being steadily carried forward. On the first of last month it had attained a height of 178 m. (587 feet), and the present rate of progress is at the rate of 36 feet per week. If this be maintained, the whole of the principal parts of this immense structure will be erected by the end of January, 1889. Meanwhile the decorative and accessory parts of the work are not neglected, and there is every prospect that the tower will be completed in all its details at the opening of the exhibition.

Vulcanized fiber for mechanical purposes has for some time attracted attention. As a material for cogs, where the moist from ordinary gearing is inconvenient, it has, according to all accounts, given very satisfactory results. In one case gutta percha cogs are known to have been used for 20 years. When the wheels became worn, the material was utilized for casting fresh ones.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Dec. 5, 1888.

Copper has been quieter the past week. Consumers have purchased sparingly, and, as a rule, only when supplies might be secured at less than the "syndicate" prices. Speculation has been on a smaller scale, with the buying still confined mainly to the "syndicate" agents. There are again reports of a new company forming to carry out the proposed extended contracts with the several mining companies, but nothing definite regarding the success of the project appears to be known in "outside" quarters.

Negotiations are under way in Paris for the sale of the Anaconda mine's 1889 product by the "syndicate," but at last accounts the sale had not been consummated. The product of the last six months of the current year was placed at 15/ per unit.

Accurate data just made public shows that the importations of Matte into England the past 11 months aggregated 26,000 tons.

Block Tin has declined about 15/ owing to free offerings for distant future delivery, especially by importers, and a more or less general belief that that fact indicates fuller supplies later on. The available stock here is low, however, and in few hands.

Pig Iron warrants have undergone a further advance, and the market for these and for Makers' Iron continues to harden. The upward tendency of prices, however, is due to the banking down of furnaces, consequent upon scarcity of fuel, and not to increased demand. Purchases for consumption and export are of somewhat restricted volume, as is not unusual toward Christmas time. The demand for Hematites has shown considerable spirit and liberal purchases have been made for consumption at 1/ @ 2/ advance. Most brands of Scotch Pig are 6d to 1/ higher, and 3d advance has been paid for Middlesboro'.

A good trade is doing in nearly all descriptions of Steel, and makers, as a rule, have sufficient orders to keep their works actively employed over the turn of the year. In Siemens-Martin Plates and Angles the activity has been remarkably prominent during the past 30 days. The large capacity of the Steel mills in operation serves, however, to check any considerable advance in prices. There have been numerous inquiries the past week on Steel Blooms and Billets for the American market. The West Cumberland Iron and Steel Company has suspended, labor disputes having seriously interfered with the carrying out of contracts.

The Tin-Plate trade has been very quiet. Buyers operate cautiously and with a view to purchasing at lower prices. On the other hand, the majority of makers who have closely sold their output are indifferent to current offers in view of the firmness of prices for Plate Bars and probabilities of an advance on the same.

Cleveland Pig.—Transactions have been larger, and prices are a fraction higher. No. 1 Middlesboro', G.M.B., 36/6; No. 3 do., 34/.

Scotch Pig.—The market has shown a fair degree of spirit, and prices are higher on nearly all brands.

No. 1 Coltness, f.o.b. Glasgow	50/
No. 1 Summerlee, " "	50/
No. 1 Gartsherrie, " "	48/6
No. 1 Langloan, " "	49/8
No. 1 Carnbroe, " "	43/6
No. 1 Shotts, " at Leith	49/
No. 1 Glengarnock, " Ardrossan	47/6
No. 1 Dalmellington, " "	43/6
No. 1 Eglinton, " "	42/3

Steamer freights, Glasgow to New York, 3/6, Liverpool to New York, 10/.

Bessemer Pig.—There has been a large business and prices have advanced about 2/ during the week. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen.—The output is closely absorbed and prices remain very firm. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—Business in this branch continues brisk, but prices are no higher. Standard English sections quoted at £3. 18/9, and light sections £4 @ £4. 10/, f.o.b. at N. W. England shipping point.

Steel Blooms.—There is a fair demand, but new business moderate. We quote £3. 18/9 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—For these the demand is still fairly active and prices firm. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—There has been more doing, but at somewhat modified prices. Bessemer, £3. 18/9, f.o.b. at N. W. England shipping point.

Old Rails.—Demand runs fair, and prices are quite firm. Tees quoted at £3. 6/ @ £3. 7/6, and Double Heads, £3. 7/6 @ £3. 10, c.i.f. New York.

Scrap Iron.—A fair business reported at steady prices. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Crop Ends.—The market steady, with fair demand. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—Buyers operate cautiously, but sales have been larger than during the preceding week. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/3 @ 15/6
IC Bessemer steel, Coke finish	13/6 @ 13/9
IC Siemens	12/3 @ 14/
IC Coke, B. V. grade	13/3 @ 13/6
Charcoal Terne, Dean grade	12/ @ 12/3

Manufactured Iron.—Business in most departments is still of good volume and prices remain firm. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d. @ 8 2 6
" Common	@ 5 10 0
Staff. Bl'k Sheet, singles	@ 7 10 0
Welsh Bars (f.o.b. Wales)	5 0 0 @ 5 2 6

Tin.—The market weak under freer offerings for future delivery. Straits quoted at £99. 10/ @ £100, spot, and £100 @ £100. 10/ for three months' futures.

Copper.—Dealings have been moderate at slightly lower prices. Chili Bars, £77. 10/, spot, and £78 @ £78 2/6, three months' futures. Best Selected, £80. 10/.

Lead.—The demand has been slow and the market rather weak. Soft Spanish, £13 @ £13. 2/6.

Spelter.—Transactions have been larger and the market is stronger. Silesian, ordinary, £18. 10/ @ £18. 12/6.

The H. C. Frick Coke Company, of Pittsburgh, recently shipped 900 tons of coke to New Brunswick, N. S. It went over the Baltimore and Ohio Railroad to Locust Point and thence by ocean steamer.

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira	Centa.
Florin (Netherlands)	10.3
Florin (Austria)	40.2
Florin (Portugal)	36.5
Milreis (Brazil)	51.08
Mark (Germany)	54.5
	23.5
Kilogram	Pounds.
Picul	2.205
	134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, October 26, 1888.—*Asphaltum.*—There has been a steady demand at firm figures, Boiled bringing \$14.04 per ton, f.o.b., and Crude \$6.84. The export since January 1 sums up 44,207 tons, against 36,000 last year and 34,241 in 1886. *Exchange*, 90 days' sight, \$4.80 @ \$4.86.—*E. P. Masson.*

EAST INDIES.

SINGAPORE, October 16, 1888.—*Tin.*—Has been active at \$37.75 @ \$38.25, with sales of 610 tons since the 1st inst., closing firm at \$38 per picul. The export from January 1 to the 10th inst has been: To England, 130,221 piculs, against 62,085 in 1887 and 42,587 in 1886; to the Continent, 14,971, against 20,647 and 21,219, and to the United States 36,366, against 52,322 and 28,496. *Gum Damar.*—A few lots Malacca have been taken at \$4.90 per picul. *Gum Copal.*—A sale of 100 tons was made at \$6.50 @ \$8.50 per picul. *Gutta Percha.*—Fine quality is wanted and rising; prime may be quoted \$95 @ \$115, and seconds \$55 @ \$85. *Exchange.* Four months' bank, 31¼.—*Giffillan, Wood & Co.*

PENANG, October 16, 1888.—*Tin.*—Receipts for the fortnight aggregate 9000 piculs; sales to Europeans, 420; to Chinese, 7000. The market opened at \$36.18 per picul, rose to \$38.45 and declined to \$37.75, winding up at \$37.90. China pays considerably above London parity. The export from January 1 to the 14th inst. was 110,076 piculs to England, 338 to the Continent, and 7316 to the United States. *Gum Benjamin.*—No. 1 has been selling at \$34 @ \$69, No. 2 \$30 @ \$50. *Gutta Percha.*—Prime may be quoted \$60 @ \$100. *India Rubber.*—\$70 @ \$75 per picul, as to quality, has been paid. *Exchange.*—Four months' bank bills 31¼.—*Schmidt, Kustermann & Co.*

COLOMBO, CEYLON, October 18, 1888.—*Plumbago.*—Has been selling to a moderate extent as follows, in rupees, per ton: Large Lumps, 145 @ 170; Ordinary Lumps, 125 @ 160; Chips, 80 @ 95, and Dust 40 @ 65. Following are the shipments made since the 1st inst.: To England, 16,098 cwt.; to Hamburg, 851, and to the United States 2380—together, 19,329, against 4508 in 1887, 22,457 in 1886, and 17,555 in 1885. *Exchange.*—Six months' sight, 1/4 15-16.—*Volkart Brothers, through their agent, John W. Greene, 82 Wall street, New York.*

MANILA, November 26, 1888.—*Hemp* has been dull at nominally \$11.50 per picul, against \$9.50 same date last year, equaling per ton, cost and freight, \$37. 17/6, against \$33. 12/. The clearances for the United States since last cable amount to 11,000 bales, against 7000 in 1887; since January 1st, 222,000, against 238,000; loading for the United States, 25,000, against 14,000; cleared for England since January 1, 312,000 bales, against 210,000; loading for do., 15,000, against none; cleared for all other ports, 65,000 bales, against 41,000; receipts at all ports since last cable, 16,000, against 19,000; since January 1, 600,000 bales, against 496,000 in 1887 and 365,000 in 1886. *Freight*, \$7, against \$5.50. *Exchange*, six months' sight, 3/7½, against 3/8.—*Ker & Co., per cable to Mr. Charles Nordhaus, East India agent, 89 Water street, New York.*

JAPAN.

YOKOHAMA, October 14, 1888.—*Coal.*—Japan produces at present 1,000,000 tons, and exported last year 704,935 tons, worth \$2,337,804. The Takashima mines turn out the best Coal, and produced in 1887 370,000 tons; the Muki mines, 240,000 tons; the Poronai mines, 60,000, and the remaining ones, 310,000.—*Japan Mail.*

TURKEY.

CONSTANTINOPLE, November 18, 1888.—*Mining.*—A Government decree is published in the official Gazette sanctioning a concession made the Société Minière de l'Empire Ottoman, or to the company's representative, Signor Leonidas Baltazzi, of working 14 mines situate in different localities in Turkey.—*Pera Gazette.*

PORTUGAL.

LISBON, November 22, 1888.—*Copper.*—The Barancannes Copper mines are situated four miles from Almodovar and 20 miles from the Carregueiro station on the direct railroad line to this city. A company has just been formed at London for the working of these mines with a capital of £120,000 in £1 shares, the Barancannes Copper Mining Company, Limited.

The concessions cover an area of 246 acres.—*O. Commercio.*

SPAIN.

BILBAO, November 17, 1888.—*Iron Ore.*—The Campanil mines are owned by five proprietors, and these, in view of the perceptible gradual exhaustion of these mines, have held a meeting and agreed to reduce the output for next year to one-half, and fix the price at 8/3 @ 8/6; at the same time 8/6 was offered for a superior lot, but declined, the owner not feeling disposed to part with the same for less than 9/ per ton. Some business was done in single cargoes Rubios at 6/10 @ 7/3. Total shipment to date 3,222,181 tons, against 3,789,123 in 1887.—*Bilbao Marítimo y Comercial.*

GERMANY.

HAMBURG, November 24, 1888.—*Iron.*—Pig Iron has been moderately active, and the only change occurring has been the raising of Forge Pig 1 mark per ton. Spiegel has been steady at 53 marks per ton for 10 to 12 %. Merchant has been the reverse of brisk in Rhenish-Westphalia, both the home and export demand being slack. The entire Wire branch is flat. The quotations are, per ton, Merchant, 125 @ 127.50; Beams, 135; Hoop Iron, 125; Boiler Plates, 170; Tank do., 150; Siegen Thin Sheets, 148 @ 150; Steel Sheets, 150, and Steel Rails, 117.50 @ 120. Exportation of Iron and Steel from Upper Silesia to Russia has been resumed on a very large scale, especially since the financial improvement in that country. Hence, there is not a single branch in Silesia in the line which does not flourish at present, the Wire branch included. *Metals.*—The rumors about a new Spelter syndicate of Belgian and German makers are without foundation. The international Spelter syndicate will expire on July 1 next year, and in spring efforts will be made to renew it for five years. It merely restricts production, and does not control prices. Brass manufacturers complain that they cannot obtain prices sufficiently high for their goods to correspond to the high price they have to pay for Copper, there being no margin left to speak of. Consumers of Tin make similar assertions. At 210 marks for Tin, they say they cannot make any money.—*Borsenhalle.*

The Wear of Rails.

The comparative wearing qualities of iron and steel rails formed a very fruitful topic of discussion at one time in railroad circles, but the question suddenly lost its vitality when the price of steel rails fell below the cost of production of iron rails. It is, therefore, a matter of much less interest than would have been the case, say ten years since, to note the experience in this respect of the Wabash Railway, which has just been made public. The company removed from its tracks this fall some iron rails which had been first laid down in 1856, and about the same time they took up some English steel rails which were first used in 1873. The iron rails, after a life of 32 years, were sold to be remanufactured, and the steel rails, which had been in use for 15 years, were relaid on a branch road, where they are expected to last for 12 to 15 years more. The "expectation of life" in either case would therefore seem to be nearly the same, with the difference in favor of the iron rails, probably due to the fact that the latter began their career in an era of less traffic, slower trains, lighter locomotives and smaller freight cars. Nevertheless, the facts cited go far to sustain the position of the erstwhile advocates of the continued use of iron rails, that well-made iron rails would sustain the wear and tear of regular railroad traffic as well as steel rails. It is worthy of note, in this connection, that the Wabash steel rails cost \$103 per ton, in gold, in 1873, and that the old iron rails were sold this fall for more than three-fourths the price of new steel rails, ton for ton.

Western merchants and commercial travelers are agitating the adoption by all lines of railroad of a 5000-mile interchangeable ticket. It is urged that if a few lines can arrange to use such a ticket, as they have done, it would be perfectly feasible to make it general.

Hardware.

There is only a moderate amount of trade, orders for the most part being limited to small lots required for completing assortments, and comprising a good many seasonable goods. Prices remain remarkably steady, the narrow margin of profit not permitting further reductions. Business throughout the country is generally reported as quite satisfactory, and anticipations of a good winter's trade are entertained.

Wire Nails.

Business in Wire Nails is limited for the most part to small lots and the aggregate of the transactions is not large. Prices are well maintained by the manufacturers, there being, however, a disposition to offer less than carload lots at carload prices, and some of the manufacturers are apparently more solicitous than they have been to book orders. The condition of the market is, however, satisfactory, and considering the large quantities of Nails purchased at the low prices lately ruling, the market is remarkably firm.

Barb Wire.

The volume of business in this market is quite limited and confined for the most part to small lots, notwithstanding the fact that some Western Wire is offered in this market and some sales effected. The Eastern makers are holding quite firmly to the following quotations, which include delivery: Four-Point Galvanized, small lots, 3.9 cents; 3-ton lots, 3.7 cents; carload lots, 3.9 cents.

The Freeman Wire Company, of St. Louis, Mo., report a fair volume of business at steady prices, as per the following quotations: 2 or 4 Point Painted in carload lots, 2.8 cents; less than carload lots, 2.90 cents, with advance for Galvanized of 6 to 7 cents.

Cut Nails.

The New York market has developed a little more activity, but prices remain at \$1.80 to \$1.90 for carload lots. The stories of heavy buying at Pittsburgh, with a view to cornering the market, telegraphed to the daily press in this city are regarded as absurd by the Nail trade in this city. A leading merchant suggested that 50,000 keg, the quantity spoken of, would not make much of an impression in the stock of the Wheeling district and the Mahoning Valley.

From Pittsburgh we receive the following: An important meeting of the Western Cut Nail manufacturers was held at the office of the Benwood Iron Works, Wheeling, W. Va., on Tuesday, the 27th ult. W. H. Wallace, of the Jefferson Iron Works, Steubenville, Ohio, presided, while C. E. Irwin, of the La Belle Iron Works, Wheeling, W. Va., acted as secretary. The attendance was large, every Nail concern west of the mountains being represented either in person or by proxy, with the exception of the Pittsburgh concerns. The Nail manufacturers of that city have about retired from the Nail business, which will account in part for their failure to be present. The present demoralized condition of the trade was thoroughly discussed, and the expression was unanimous that some plan be devised to stay the general demoralization that now characterizes the trade. A plan was drawn up and presented looking to the close association of the factories, the establishment of a guarantee fund and the creation of more harmonious relations between those engaged in the trade. The details of the plan were not fully arranged, but it seemed to be the impression of those present that with certain changes it could be made to operate successfully. As some of

the members present did not care to bind themselves to it without consulting the officers and directors of their works, it was informally laid over until Tuesday, the 11th inst., when an adjourned meeting will be held to take action upon it.

Miscellaneous Prices.

Copper Rivets and Burrs are held pretty steadily at the prices which have recently been prevailing, but the goods are being offered by some makers at figures which are a concession from those regularly made.

There has been no material change in the Sandpaper market, which continues low and uneven. The Springfield Glue and Emery Wheel Company, Springfield, Mass., are quoting Flint Paper at discount 50 per cent., with freight prepaid, on orders amounting to five reams or rolls or more. They also refer to the quality of the paper, and also to their Garnet Paper and its superior excellence.

The change in the price of Shot, to which we referred in a recent issue as likely to occur, was made by the manufacturers December 1, a further reduction of 7 cents per pound being announced. Prices are as follows, subject to a discount of 2 cents per bag of 25 pounds for cash within five days:

Drop, per 25-pound bag.....	\$1.16
Drop, per 5-pound bag.....	.20
Buck and Chilled, per 25-pound bag.....	1.41
Buck and Chilled, per 5-pound bag.....	.34
Dust, per 25-pound bag.....	1.75
Dust, per 5-pound bag.....	.40

It is considered, at these revised prices, that Shot about corresponds with the price of Lead, and the present condition does not appear to give any reason for a further decline. It will also be observed that the above prices for Shot are exceptionally low, and it is thought probable that somewhat advanced prices will be named within a few months.

The market for Steel Squares shows but little change, except that somewhat lower quotations are named by some of the manufacturers.

For some time Fence Staples, Galvanized and Plain, have been regularly sold at the same price as Barbed Wire, but recently manufacturers have shown a disposition to make slight concessions on the Staples when sold in good lots.

The jobbers are giving attention to the Wire Cloth market, and beginning to place their orders for the coming season. The figures which are quoted by the manufacturers on this line of goods are regarded as slightly lower than those that prevailed a year ago, indicating that purchasers will obtain slight concessions during the coming season. It will, however, be the part of wisdom for the trade not to force prices below a profitable level, as in this line of goods there is a liability that the quality will suffer if the prices are unremunerative.

The market for Lead Pencils is in an unsettled condition, and prices, owing to the termination of an understanding between the manufacturers, are considerably lower than heretofore.

Stuart & McLean, Iron and Steel factors, Hamilton Building, Pittsburgh, Pa., issue from time to time quotations on varied lines of goods which they are prepared to supply to the trade. They intimate that they are now in a position to furnish Square Nuts at terms which are deserving of attention.

The following is our report of the Louisville market, dated December 8:

The Hardware trade of Louisville, Ky., during the past week has been a little improvement over the previous one. Some jobbing houses report business as slow, but then we are to expect a hold-up now for a while. Others,

again, are very busy, especially those handling heavy goods.

Cut Nails have in a measure recovered, a good feeling prevailing, and the trade which has lent a willing hand to the mills must be protected by them. A general stiffening up individually seems to be going on, without concert of action, and if this is kept up it will be more satisfactory to the trade than the nominal association advances. Wire Nails are in good demand, and are held firm by the mills.

Barb Wire has made the greatest cut ever known to the trade, and has reached a point never before dreamed of, and the worst of it is some manufacturers have given prices to the small trade, buying not more than one car, same as to jobbers who take five to ten carloads. There is no telling where prices will go to. Through the upper cotton belt territory reached by Louisville nearly one-half the cotton crop, which is a large one, is still unpicked in the fields. This is apt to lead to tardy remittances, and is caused by two factors, the long and heavy rains and the demoralization of the negro labor by the result of the election, they not realizing that they will have to work just as hard for a living as last year, and the cotton crop is dependent entirely on them for artisans.

We have received the following details concerning the new Hardware jobbing house to be started at Omaha, Neb. It will be conducted by the

Omaha Hardware Company.

a corporation organized under the laws of Nebraska, for which articles were filed with the county clerk of Douglas County on the 15th of November. The authorized capital is \$500,000, divided into shares of \$100 each. Stock to the amount of \$200,000 was issued, which will be fully paid up. The indebtedness will be limited to 60 per cent. of the amount of stock issued. The affairs of the business will be governed by a board of seven directors. The officers of the company are as follows: T. H. Taylor, general manager; P. C. Himebaugh, president; I. A. Miller, vice-president; W. H. Hulshizer, secretary; A. S. Carter, treasurer. They have leased the new Ames building, situated at the corner of Ninth and Jones streets, Omaha. This building is 44 feet front by 132 feet deep, containing six floors, which will give the company ample room for the present. It is in the heart of the city, yet is located on the railroad tracks, and thus possesses unusually good facilities for the prompt and speedy transaction of business. The company have already secured the services of a corps of old and experienced traveling salesmen, who are thoroughly acquainted with the territory and trade tributary to Omaha. The active officers of the company are young men of recognized ability and long experience, and have an extensive acquaintance throughout the East and West that will prove valuable to the concern. They are backed by men whose names are a guarantee of the stability of the new undertaking, and they will have ample capital with which to conduct a successful business. The present condition of the Hardware market is regarded as very favorable for the purchase of a new jobbing stock, because prices on many staple articles are now ranging lower than has ever before been known in the Hardware line. At the same time the prospect for business in the coming year in that section of the West is remarkably bright, so that altogether the new house will start out under most encouraging auspices and with very bright anticipations of a prosperous career.

Items.

Kellogg, Johnson & Bli.s, 108 and 110 Randolph street, Chicago, have issued an illustrated price list of Woodworkers' Tools. It is a handsome volume of 154 pages, bound in stiff paper covers, and presents a bewildering variety of illustrations of Tools used by carpenters, cabinet-makers, carvers, bridge builders, ship carpenters, lumbermen, &c. Large as the list of contents is, the firm say that it falls

far short of what they carry in stock, as they make a specialty of Tools. Full directions how to order are printed in the preface. An excellent feature of the book is an alphabetical index giving the names of all the Tools mentioned and the pages on which they are to be found described. The last 15 pages are devoted to a full list of special net cash prices, in which the several sizes of each article are quoted separately. The book is an extremely valuable publication for mechanics, who will find in it many Tools not frequently brought to their notice, but whose value to them will at once be recognized. The firm have printed a limited edition of the work, and therefore prefer to confine its distribution to the Northwest, including Michigan and Indiana, that portion of the country being their natural territory.

The Sanford Fork and Tool Company, Terre Haute, Ind., of which Robert Nixon is president, H. A. Urban secretary and H. S. Deming treasurer, have issued a new catalogue of their line of Forks, Rakes, Hoes, &c. It is a handsomely printed pamphlet in two colors on excellent paper and shows effectively their well-known line of goods.

Gaston, Weston & Ladd, Torrington, Conn., issue circulars relating to Prestoline, a liquid metal burnisher, for use on brass, bronze, copper, steel, zinc, tin, nickel, German silver, &c. Another circular is devoted to Gaston's Silver Compound for silver plating, cleaning and polishing. This is described as a preparation of pure silver and chemicals, and is warranted to contain 12 grains of sterling silver per fluid ounce of solution.

Lufkin Rule Company, Cleveland, Ohio, issue a striking sheet in which their Rules, Perfection Glass Board and other manufactures are illustrated, and also a separate circular devoted to the Glass Board, for which a number of testimonials are given.

Rector & Wilhemy Company, Omaha, Neb., issue a circular of IXL Ventilator, manufactured by M. F. Koenig & Co., explaining its construction and giving testimonials in regard to it.

William T. Valentine & Son, Albany, N. Y., issue a circular entitled "What is Felt Weather Strip?" in which they give a description of their manufactures, enumerating the advantages possessed by them. Their illustrated catalogue shows the different patterns in which they are putting the goods on the market.

William C. Vajen, who is well known to the Hardware trade, has branched out into a new line of business, having opened an office at 79 East Market street, Indianapolis, Ind. Real estate, loans and insurance will here receive his attention.

Bennett & Shirk, manufacturers' agents for a variety of specialties handled by the Hardware trade, have removed from 154 Lake street to 112 and 114 Lake street, Chicago. Their removal was caused by their desire to secure sufficient room to carry a stock of the goods which they sell. In their new location they secure ample facilities to make this change in their system of transacting business. By shipping from stock in Chicago they will be enabled to meet the demands of a large class of merchants who desire to be served more promptly than if they were obliged to await shipments from factory.

The John Pritzlaff Hardware Company, Milwaukee, Wis., have issued their No. 3 price current under date November 27. It illustrates Skates and Sleigh Bells, including Saddle and Shaft Chime Bells. Illustrations, list prices and discounts are given.

Stanley's "Odd-Jobs," a very unique tool, first manufactured by the Stanley

Rule and Level Company in June last, has already proven its right to be. The manufacturers report sales of 6000 of these tools at this date, and that without diminishing the demand for their other tools, of which this single one embraces 10 or 12 different kinds. The artistic form given to the tool, and its nickel-plate finish, commend it as a holiday present for mechanics or amateurs.

The Gooch Freezer Company, Cincinnati, Ohio, issue a circular calling attention to the Peerless and Giant Ice-Cream Freezers, in which their special features are explained and some of the advantages claimed for them enumerated.

Peavey Brothers, of Sioux City, Iowa, are about to retire from the jobbing trade, and their traveling salesmen are now seeking other connections for next year. It is understood that the members of the firm have invested in a street railway, and propose to devote their time and energy to operating it.

The Peters Cartridge Company, Cincinnati, Ohio, issue a circular relating to their Crimped Cartridges, concerning the loading of which they give information. It is stated that until their new catalogue is issued the Crimped Cartridges may be ordered by the same old numbers as the Indented if it is stated which are desired, Crimped or Indented. The prices and discounts are the same in either case.

Hamblin & Russell Mfg. Company, Worcester, Mass., advise us that they carry a stock of Wire Goods and Hardware Specialties at 20 Cliff street, New York, where they are represented by J. A. Boughan.

Clark, Quien & Morse, Peoria, Ill., have issued a 60-page pamphlet, well arranged and neatly printed, relating to Metals, Stamped Ware, Tinners' Trimmings, Japanese Ware, &c., and showing an interesting and well-assorted line of these goods, all of which, we are advised, are carried in stock.

Hamblin & Russell Mfg. Company, Worcester, Mass., have adopted the method of representing their goods in miniature on the back of their letter paper, thus in a small space giving illustrations and bills of a large variety of Hardware specialties.

Joseph Churchyard's Sons, Buffalo, N. Y., are about issuing an attractively printed catalogue relating to their Refrigerators, Ice Chests and Bellows. The address to the trade refers to the characteristics of, and claims for, their line of Refrigerators, which is referred to as having been very favorably regarded by the trade during the past season, when they were first put on the market. They have added a number of new designs to their line, which are appropriately illustrated.

The St. Joseph Iron Company, St. Joseph, Mo., issue a convenient sheet of prices representing their line of Iron and Steel, Heavy Hardware, Wagon and Carriage Hardware, &c. The different lines are classified and net prices given.

The Ross & Fuller Association, 88 Chambers street, New York, have been appointed general salesmen by the Elizabethport Cordage Company, Elizabethport, N. J., for the sale of their products, such as Manila and Sisal Rope, Binders' Twine, &c. A full line of samples can be seen at their sample-room. All orders will be filled at factory prices.

The following from the Australasian *Ironmonger* refers to the position in the Colonial markets of American Cutlery:

The efforts made by American manufacturers of Cutlery to open a market here have been few and far between, and sufficient energy has not been shown in pushing a trade. Finding the competition very great in this class of

goods, and not by any means an easy job to have it all their own way, they have neglected this for other markets where a larger business can be done and better profits realized. The failure here is because the prices are a shade higher and the effort required to alter the current of an established trade has not been properly made. The only firm I have heard of as well known here is the Henry Seymour Cutlery Company, New York City, manufacturers of Tailor Shears, Shears and Scissors, although other firms are no doubt heard of through indentors. The John Russell Cutlery Company is one of these. An exception to the above is to be found in Butchers' Knives, which are highly appreciated and have a good sale.

Nathaniel Jacobi, Wilmington, Del., announces that he has taken his son Marcus W. Jacobi into partnership, and that hereafter the business will be conducted under the name and style of the N. Jacobi Hardware Company.

The Gibbs Lawn Rake Company, Canton, Ohio, have appointed John H. Graham & Co., 113 Chambers street, New York, their general agents for the United States, from whom their goods may be had at all times at factory prices. The company are manufacturers of the Gibbs and Canton Lawn Rakes and Gibbs and Imperial Post-Hole Diggers, Grub Hoes and Lawn-Hose Holders. This agency went into effect November 24, and the company announce that all quotations prior to that date not under contract are withdrawn.

Paine, Diehl & Co., Philadelphia, have secured the control of the Keystone Beater, which is so favorably known to the trade. They are making arrangements, we understand, for its manufacture on an enlarged scale and for the effective marketing of it in all parts of the country. Orders and inquiries from the trade should, therefore, be addressed to them.

Alfred Field & Co., 93 Chambers street, New York, are calling attention in their announcement on page 66 to their Improved Double Action Acme Skates, No. 5. The point which they emphasize is that the lever works both right and left, so that each Skate can be used for either foot, and all parts are screwed, not riveted.

The Proposed Hardware Syndicate in England.

The movement for the organization of an association of ironmongers in England for the consolidation of their purchases, to which we referred in our last issue, is evidently regarded there with much interest, and a number of letters on the subject appear in the English journals. From the tenor of many of these it is evident that trade there is interfered with to a large extent by the competition of co-operative stores, the handling of Hardware by houses engaged in other lines of business, and the selling by the manufacturers direct to the consumers. At the same time there would appear to be on the part of the Hardware trade in that country a lack of enterprise and push, which, from the American standpoint, are regarded as essential to the successful prosecution of any business. There are also indications that the trade are in the habit of purchasing on time instead of for cash, and without that promptness in payment which is so important a factor in profitable buying. On this point a retired manufacturer publishes the following letter in the London *Ironmonger*, and it will be observed that the considerations to which he refers are equally applicable to trade on either side of the ocean:

There are certain classes of tradesmen—ironmongers in particular—who "wonder how it is they cannot sell as cheaply as, and compete with, others selling the same class of goods as themselves." The solution of the problem is easy and simple. The "Co-operative Stores," "Supply Associations," and "Give Away" tea shops are their greatest enemies, and these they have to compete with. How are they to

do it? Simply by trading in the same spirit, and under the same conditions, as their rivals—viz., liberal purchases, prompt payment, with "small profits and quick returns." But the grand secret lies in the buying and mode of payment. The three classes named above, as a rule, order largely and pay promptly, and thereby secure advantages from the concessions made to them by the manufacturers. It is only reasonable to infer that a manufacturer will gain a greater advantage from a liberal order with prompt payment than from several small orders with a deferred payment, though in the former case he may allow a greater discount; and this discount is the profit to the purchaser. But when the manufacturer supplies goods in small quantities, and is compelled to submit to deferred payment, has to pay a collector, and keep his books open for an unlimited time, it is surely unreasonable to suppose that his customer can compete with those trading under opposite conditions, as the manufacturer must reimburse himself for his loss of time, collector's fees, and loss of interest on his money by allowing his customer no discount at all; so that a sum must be added by the retailer to the price of the goods for his profit, instead of getting it off the manufacturer in the shape of discount. Under these circumstances the parties complaining cannot expect to be able to compete.

Another correspondent, referring to the proposed co-operation of ironmongers, suggests that a syndicate or society of subscribers or shareholders be formed, the objects of the association being as follows:

1. Open a central office or establishment in London, where samples and price lists of such manufacturers as confine themselves to the legitimate trade may be seen and consulted.
2. To supply the names of all so-called wholesale houses who have been known to sell to retail buyers.
3. To enter into arrangements with manufacturers for the supply for cash of large consignments of some (beginning with a few) of the leading articles regularly kept by ironmongers, to be distributed, also for cash, to the members.
4. To admit to membership those only who are *bona-fide* ironmongers and have served an apprenticeship to the trade.
5. To hold regular meetings, quarterly or otherwise, at which all members should be free to discuss matters of interest to the society and exchange ideas and information for their mutual benefit.

Business Tendencies.

The widespread interest in the questions suggested by the table of Fred. P. Straub & Co., Evansville, Ind., which we published several weeks ago, is evidenced by the communications we have in successive issues laid before our readers. In several of these this table was referred to, and suggestions were made in regard to the scope of the business done by the Evansville house, with the intimation that the significance of the table would depend somewhat upon the precise line of goods handled, and especially as to whether it related to a strictly Hardware business, or included also some of the related lines, which are frequently combined with the regular Hardware stock. As giving more precisely the import of the table, Fred. P. Straub & Co. advise us that they do not deal in Iron, Stoves, Farm Machinery, Wagons, Paints, Oils, Glass, &c., but confine their business strictly to Hardware, and sell at retail only. They add that as they pay cash (10 days or less) for all their goods they are in a position to buy where they can to the best advantage, whether from jobbers or manufacturers. It will thus be seen that the table refers to a representative Hardware business, and does not reflect the influence of dealing in other lines.

The St. Louis Screw Company, recently incorporated, at St. Louis, have elected the following officers: President, W. H. Hass; vice-president, C. Hafinger; secretary and treasurer, E. J. Miller. Additional machinery for their factory, consisting of automatic screw machines for the manufacture of set cap screws, has arrived from the East and is now being set up.

Chicago as a Hardware Center.

The great advantages possessed by Chicago as a point for the distribution of goods of all kinds over a vast territory are felt no less in the Hardware trade than in any other line. The vast system of inland navigation in which the great lakes constitute the most important part contributes its share toward keeping down the rate of freight on goods received at Chicago from the East, while no other city in the world has such a magnificent system of important railroads connecting it with the surrounding country. So many of these railroads compete for traffic over the same territory that a reasonable rate of freight is almost positively assured, with an almost equally positive guarantee that their rivalry will frequently cause wars in rates, reducing them still lower and always insuring to the benefit of Chicago business interests. The extension of Chicago trade has been co-equal with the extension of railroad facilities from Chicago to the West and Northwest, competition from other jobbing centers interfering to a considerable extent with its growth toward the East and South. But from Ohio to the Pacific Coast there is hardly a hamlet which is not regularly visited by some traveling salesman in the interest of a Chicago Hardware house.

I.—The Jobbing Trade.

The regular jobbers of Hardware in Chicago comprise six houses—namely, HIBBARD, SPENCER, BARTLETT & Co., THE WELLS and NELLEGER COMPANY, MARKLEY, ALLING & Co., A. F. SEEBERGER & Co., EDWIN HUNT'S SONS and HORTON, GILMORE, McWILLIAMS & Co. These houses transact a strictly jobbing business, making Shelf Hardware their leading line and adding to it such specialties or auxiliary branches as they find can be most easily or profitably handled. A large number of branch houses and manufacturers' agencies for handling Hardware specialties are located in Chicago, but they are not properly classed with jobbing houses and are separately enumerated below. Other Hardware houses, such as KELLOGG, JOHNSON & BLISS, ORR & LOCKETT, BULLARD & GORMLEY, S. J. SURDAM & Co., HODGE & HOMER, STANDART & Co., C. CARR & SONS, KEENE BROS., F. A. OSWALD & Co., ANDREW REAM, RENDTORFF HARDWARE COMPANY and F. A. STAUBER & Co., confine their attention mainly to the retail trade, but also sell large quantities of goods to contractors, builders and other heavy consumers, identifying themselves to that extent with the wholesale trade. In the same way GIBSON, PARISH & Co., E. N. BERBECKER, THE CHICAGO FURNITURE SUPPLY COMPANY, HENER & BROCK-SCHMIDT and MARSHALL FIELD are connected with the Cabinet Hardware trade. A specialty of Cutlery is made by the HENRY SEARS COMPANY, RANDALL, HALL & Co. and C. B. JAMES, while a few firms, such as COLTER & Co., SCHUTT & Co., BUTLER BROS. and C. M. LININGTON, handle Penknives and one or two other lines of Cutlery in connection with other goods. In Tinware and House Furnishing Goods generally C. SIDNEY SHEPARD & Co., THE CHICAGO STAMPING COMPANY, DENNISON & HAMILTON and KIECKHEFER, BARTLING & Co. job a considerable line in addition to their own goods. GORDON M. RICHARDSON is also a jobber of Tinware.

The jobbers of Heavy Hardware, Wagon Stock, &c., comprise PARKHURST & WILKINSON, S. D. KIMBARK, KELLEY, MAUS & Co., MICHAEL GREENEBAUM'S SONS and CARRUTHERS & Co. Quite a number of special lines are represented in a wholesale way—as, for instance, Locksmiths', Bell-hangers' and Electrical Supplies—by J. F. WOLLENSAK, and Tools and Machinists' Supplies by C. H. BESLY & Co., but the entire list would be too long for the purposes of this article.

Recurring to the strictly Hardware jobbing houses, the following is a bird's-eye view of their character, the departments into which they are divided, the assortment of goods which they carry, the exclusive lines handled by each and the specialties made most prominent.

Hibbard, Spencer, Bartlett & Co. are jobbers and importers of Builders' Shelf and General Hardware, of Pressed, Pieced and Japanned Ware and of all kinds of Agricultural Implements, not including Machines. They are exclusive jobbing agents for the Ashtabula Tool Company's Diamond Steel goods. A large department is entirely devoted to American, English and German Cutlery. Silver-Plate Ware is carried in every variety. The line of staple goods embraces Steel Nails, Wire Nails, Sheet Iron, Metals, &c. One of the largest features of their business is the trade in Tin Plate, the stock being imported direct and sold largely to the jobbing trade. Their Gun department contains Guns, Rifles, Revolvers, Ammunition, Fishing Tackle, Base Balls, Bicycles and every variety of sporting goods known to the trade. Their own importations of Belgian and English Guns, as well as all the leading American makes, are always in stock. They have recently taken the Chicago agency for the Rochester Lamps, and it has already proved a large business in itself. They are large buyers of Yerkes & Plumb's and Blood's lines of Hatchets, Yerkes & Plumb's and Maydole's Hammers, Henry Disston & Sons' Saws, Bailey and Stanley Iron Planes, the Sandusky Tool Company's Wood Planes, the American, Disston and Nicholson Files, Bradford Lock Works' complete line of Locks, Knobs, &c., Yale & Towne Mfg. Company's Yale Locks, Eagle Lock Company's Chest, Till, Trunk and Cabinet Locks, Wm. Wilcox & Co.'s Padlocks, Burden's Horsehoes, the Northwestern, Globe, Champion, Star, Putnam, Maud S. and C. B. K. Horse Nails, Western agents for Barney & Berry's Skates, sole United States dealers in the C. H. Conover Socket Strap, Scoops, Shovels and Spades, and also handle Ames' and Chisholm's Shovels, Spades and Scoops, Blood's and Maine Scythes, Vermont Snaths, Rowlett's Champion Lawn Mower, Philadelphia Mowers, &c. Their line further embraces Snaps, Bits and other Saddlery Hardware, Whips, Curry Combs, Brushes, &c., Sleigh Bells, Hand Sleighs, Rope and Mixed Paints. Barb Wire is a very important line, their jobbing trade in it being especially large. They carry the Welch Clock Company's complete line of Clocks and the Lalance & Grosjean Mfg. Company's Agate-Ware. Their line of dairy supplies, such as Railroad and Factory Can stock, Cream Pails and Gauges, Tin Plate for Milk Cans, &c., is particularly complete. In connection with this come Tinnners' Tools and Machines and Tinnners' Trimmings and a full line of Iron Stove Hollow-Ware, Brushes and Wooden-Ware. They are general Western agents for the Belding Mfg. Company's new Perfection Hardwood Refrigerator, agents for Heintz & Munchauer's complete line of Bird Cages, and carry a stock of Lanterns in great variety. They are represented by traveling men in every State and Territory from Ohio to

Pacific Coast, and their trade is each year increasing.

Markley, Alling & Co. have a full line of General Hardware, and also carry a stock of Ammunition and Fishing Tackle. They pay special attention to Cutlery, Tinner's Stock and Tin Plate. They also give considerable attention to smaller agricultural tools, the goods of the Otsego Fork Company being handled exclusively by them in the Chicago market. They sell goods in Missouri, Dakota, Montana, Idaho and Washington Territory, closely covering the States nearer home, reaching into Indiana.

The Wells & Nellegar Company, in addition to the general line of Hardware, are exclusive agents for Batcheller & Sons' Steel Goods, Jefferson Steel Cut Nails, Wetherald Wire Nails, and make specialties of Lyman Barb Wire, Guns, Ammunition, Sporting Goods, Fishing Tackle and Cutlery. It has always been the aim of this house to confine their assortment of goods to strictly first-class brands, such as Sargent's Shelf Goods, Disston's Saws, Nicholson and Disston Files, Branford Locks and Knobs, &c. Within the past 18 months this company have disposed of the entire stock of the late firm of Keith, Benham & Dezendorf, and now claim as complete an assortment as can be found in the stocks of their competitors. They state that their trade has increased throughout the whole of the present year, which speaks well for their energy and enterprise. They have representatives on the Pacific slope as well as in each of the States and Territories between that section and Chicago, their trade extending down into Arizona.

A. F. Seeberger & Co.'s house was established in 1864, and has built up a large trade in general Hardware, Metals, Tinner's Stock, &c. They are agents in the Chicago market for the Kelly Axe Company, Grand Rapids Refrigerator Company, Continental and Forest City Lawn Mowers, Great American Meat Choppers, Iowa Farming Tool Company, Empire Wringers, Hero Spring Hinges, Lawrence Steel Barn-Door Hangers, Marshall Sheep Shears, and the Tacks, Brads, &c., of the Stanley Works. Their stock embraces the American Screw Company's Screws, Sargent & Company's Shelf Hardware, Maydole's and Selsor's Hammers, Disston's Saws, Wheeler, Madden & Clemson's Saws, the Locks, Knobs, &c., of the Nimick & Britton Mfg. Company, Russell & Erwin Mfg. Company, and Mallory, Wheeler & Co., &c. In their Sporting Goods department they sell the celebrated Henry Leigh Guns, also all the leading makes of Fire-Arms and Ammunition. They carry stocks of the Norwich Cutlery Company's Pocket-Knives, Nonpareil Razors, &c. Their trade extends from Western Ohio to the Pacific Coast, while they receive orders for Sporting Goods, including Fishing Tackle and other belongings, from all over the South.

Edwin Hunt's Sons date their business back to 1833, when their house was founded in New York. It was removed to Chicago in 1847. They carry a general line of Hardware, Metals, Cutlery, Nails, &c., making a specialty of Shelf Goods. They are Northwestern agents for the Ice Tools manufactured by Wm. T. Wood & Co., of Boston, and maintain an ice dealers' supply depot. Their trade extends from Indiana to Dakota, over all the country naturally tributary to Chicago.

Horton, Gilmore, McWilliams & Co., as the successors of William Blair & Co., have a reputation for fair dealing, first quality goods, and low prices, which naturally gives them a very large mail order business. They carry a very large assortment of goods, embracing the lines of leading makers, covering new and de-

sirable goods in Hardware. The following fill a prominent place in their stock: Russell & Erwin Mfg. Company's Locks and Latches; Sargent & Co.'s General Hardware, Henry Disston & Sons' Saws and Files, Nicholson's Files, E. W. Gilmore's and Stanley Works' Hinges and Butts, Stanley Rule and Level Company's Tools, Charles Parker & Co.'s Line, Peck, Stow & Wilcox Company's Hardware and Tinner's Tools and Machines, D. Maydole & Co.'s Hammers, Lamson & Session Mfg. Company's Bolts, Union Steel Screw Company's Screws, Central Stamping Company's Stamped and Japanned Tinware, St. Louis Stamping Company's Granite-Ware, Douglas Axe Company's Axes and Tools, Oliver Ames & Co.'s Shovels, Spades and Scoops, and a host of other manufacturers' goods the names of which are familiar to all Hardware dealers. They are agents for the Jackson Steel and Wood Goods, and handle all descriptions of Farming Tools, but no machines. They control within the trade the sales of certain kinds of Farming Tools, House-Furnishing Goods, Horse Nails, Safety Bicycles, Door Hangers, Lawn Mowers and the Peerless Refrigerator, which will make its first appearance next season and in which they are preparing for a large business. They also deal largely in Wheeling Top Mill Nails, Wire Nails, Tin Plate, Sheet Iron, Burden's Horse Shoes and all kinds of heavy goods usually sold by the trade. They carry a large line of Lamps, Lanterns, common and fancy Clocks, Silver-plated Ware, Oxydized Silver and Gold-plated Jewelry, and Cutlery of every variety. They make a specialty of Revolvers and Ammunition, and not being members of the ammunition association sell largely of these goods at their own prices. They are now preparing a catalogue which will present some new features, and will prove valuable to the trade. The enterprise of the new firm has resulted in the extension of the trade of this house throughout all the Western States and Territories.

It may be said of all these houses, without exception, that they are not resting on their laurels, satisfied with past achievements and feeling secure in the possession of a large part of the Hardware trade of the country. They are alert, enterprising and progressive, ready to accommodate themselves to new conditions, and ever on the watch to introduce the newest and freshest ideas in the management of their business.

II.—Branch Houses and Agencies.

ST. LOUIS STAMPING CO., 16 Lake street, branch house.—*Granite-Ware*.

P. & F. CORBIN and CORBIN CABINET LOCK CO., 63 Washington street, Wm. G. Miller and John R. Scott, managers. Works at New Britain, Conn.—*Builders' Cabinet and Trunk Hardware*.

READING HARDWARE CO., 73 Wabash avenue, W. H. Bennett, manager. Factory at Reading, Pa.—*Builders' Hardware*. Also agents for Buffalo Hammer Co., Buffalo, N. Y.—*Hammers*.

E. Jencks Mfg. Co., Pawtucket, R. I.—*Bright Wire Goods*. Gwinner, Downey & Co., Hamilton, Ohio.—*Casters*.

YALE & TOWNE MFG. CO. (owning and operating the Yale Lock Mfg. Co., the Emery Scale Co. and the Western Crane Co.), 152 and 154 Wabash avenue., Wm. F. Donovan, manager.

ANSONIA BRASS AND COPPER CO., 64 Washington street, Gilbert M. Smith, agent.—*Brass and Copper Goods*.

LALANCE & GROSJEAN MFG. CO., Julien, P. Cordier, manager, 81 Michigan avenue.—*Agate-Ware*.

C. SIDNEY SHEPARD & Co., 23 and 25 Randolph street, branch of Sidney Shepard & Co., Buffalo, N. Y.—*Tin and Japanned-Ware*. Agents for Austin, Obdyke & Co., Philadelphia.

—*Corrugated Conductor Pipe*.

Hatten, Galpin & Co., Binghamton, N. Y.—*Eave-Troughs and Miters*.

New Haven Wire Goods Co., New Haven.—*Wire Broiler and Toaster*.

H. Clayton & Co., Cincinnati.—*Alcohol Stoves*.

Stuart-Peterson Co., Philadelphia.—*Enameled Kettles and Saucepans*.

H. R. Streeter & Co., Groton, N. Y.—*Sensible Sad Irons*.

Yates & Co., Rockford.—*Stove Polish*.

New Union Mfg. Co., Freeport, Ill.—*Coffee Mills*.

Heins & Munschauer, Buffalo.—*Refrigerators and Ice Chests*.

Fred. W. Baker, Rochester, N. Y.—*Kedzie Water Filters*.

They also job quite a variety of goods for which they do not have the exclusive sales agency.

J. J. CLEARY & Co., 154 Lake street, agents:

Clauss Shear Co., Fremont, Ohio.

Penna. Saw Mfg. Co., Philadelphia.

American Bit Brace Co., Buffalo.

St. Louis Refrigerator and Wooden Gutter Co.

W. H. Parkin, Cleveland, Ohio.

Rock Falls Mfg. Co., Sterling, Ill.

MORTIMER McROBERTS, 115 Lake street, agent:

The Plume & Atwood Mfg. Co., Waterbury Conn.—*Brass and Copper Wire, &c.*

Henderson & Harker Mfg. Co., Columbus, Ohio.—*Oil Cans, Elbows, &c.*

American Ring Co., Waterbury, Conn.—*Furniture Trimmings*.

C. T. Ham Mfg. Co., Rochester, N. Y.—*Tubular Lanterns, &c.*

Ridgway Refrigerator Mfg. Co., Philadelphia, Pa.—*Refrigerators and Ice-Cream Freezers*.

American Wick Mfg. Co., 26 Broadway, New York.—*Kerosene Wicks*.

COOK LEVEL CO., 154 Lake street; factory, Watertown, N. Y.—*Levels*.

M. HECKLINGER, JR., 139 Lake street, agent:

Philip Townsend & Co., Philadelphia, Pa.—*Wire Nails*.

O. L. BEARDSLEY, 92 Dearborn street, agent:

Payson Mfg. Co., Chicago.—*Sash Locks, &c.*

Belmont Nail Co., Wheeling, W. Va.

Pittsburgh Wire-Nail Co., Pittsburgh.

Anderson Bolt Works, Anderson, Ind.

H. BUTMAN, 137 Lake street, agent:

Clinton Wire-Cloth Co., Clinton, Mass.

J. C. BENNETT, 121 Lake street, manager:

Western File Co., Beaver Falls, Pa.

L. G. BEERS, 148 Lake street, manager:

Gilbert & Bennett Mfg. Co., Georgetown, Conn.—*Wire Goods*.

C. R. LAMENA, 154 Lake street, selling agent for

S. N. Brown & Co., Dayton, Ohio.—*Wheels, Hubs, &c.*

OTIS, SKILLMAN & Co., 154 Lake street, agents:

The Mallory-Wheeler Co., New Haven, Conn.—*Door Locks, &c.*

The Wm. Rogers Mfg. Co., Hartford, Conn.—*Silver-Plated Ware*.

Ten Eyck Edge Tool Co., Cattaraugus, N. Y.—*Hatchets, &c.*

Cleveland Twist Drill Co., Cleveland, Ohio.—*Drills, Taps, &c.*

Nashville Spoke and Handle Co., Nashville, Tenn.—*Axe Handles, &c.*

Union Mfg. Co., New Britain, Conn.—*Butts, &c.*

Skillman Hardware Mfg. Co., Trenton, N. J.—*Door Knobs, &c.*

- Palmer Hardware Mfg. Co., Troy, N. Y.—*Sash Pulleys*.
 Chicago Sewing Machine Co., Chicago, Ill.—*Registers, &c.*
 Hamblin & Russell Mfg. Co., Worcester, Mass.—*Wire Goods*.
 Dunn Edge Tool Co., Oakland, Me.—*Scythes, Axes, &c.*
 New Philadelphia Iron and Steel Co., New Philadelphia, Ohio.—*Sheet Iron and Steel*.
 Geo. N. Pierce & Co., Buffalo, N. Y.—*Refrigerators, Cages, &c.*
 Felix Sliding Door Hanger Co., Chicago.—*Hangers*.
- DENNISON & HAMILTON, 144-146 Lake street:
 Simonds Mfg. Co., New York.—*Registers, &c.*
 Palermo Mica Co., New York.—*Mica*.
 Nubian Iron Enamel Co., Chicago.—*Iron Enamel*.
 American Oil Stove Co., Gardner.
- BENNETT & SHIRK, 112-114 Lake street, agents:
 Ball Bros., Glass Mfg. Co., Buffalo, N. Y.—*Cans, Tanks, &c.*
 Ottumwa Cutlery Co., Ottumwa, Iowa.—*Cutlery*.
 Geo. C. Beals, Buffalo, N. Y.—*Wire, &c.*
 The Indiana Mfg. Co., Peru, Ind.—*Refrigerators*.
 Standard Fiber-Ware Co., Mankato, Minn.—*Pails, Basins, &c.*
 Reliance Edge Tool Co., Indianapolis, Ind.—*Axes, &c.*
- C. H. GURNEY & Co., 247-249 Lake street, agents:
 Atha Tool Co., Newark, N. J.
 Benjamin Atha & Co., Newark, N. J.
 Newark Steel Works, Newark, N. J.
 Jersey City Steel Co., Jersey City.
 Northwestern Screw Co., Chicago.
 Wm. H. Haskell Co., Pawtucket.
 Penn Hardware Co., Reading, Pa.
 Boston and Lockport Block Co., Lockport, N. Y.
 The J. Barton Smith Co., Philadelphia, Pa.
 H. Chapin's Son, Pine Meadow, Conn.
 James Carter, Lockport, N. Y.
 Syracuse Hardware Co., Syracuse.
 Fisher & Norris, Trenton, N. J.
 The Triumph Wringer Co., Keene.
 Cronk Hanger Co., Elmira, N. Y.
 Ryther Mfg. Co., Carthage, N. Y.
 Joliet Iron and Brass Foundry Co., Joliet, Ill.
- ANTHONY FREEMAN, 139 Lake street, agent:
 Canastota Knife Co., Canastota, N. Y.—*Pocket Cutlery*.
 J. Wiss & Sons, Newark, N. J.—*Shears, Scissors, &c.*
 A. F. Bannister & Co., Newark, N. J.—*Table Cutlery, &c.*
 E. Andrews & Sons, Williamsport, Pa.—*Saws*.
 Ray Hubbell Mfg. Co., Northville, N. Y.—*Oil Cloth Binding*.
 Birmingham Plane Mfg. Co., Birmingham, Conn.
- Low & WOODRUFF, 121 Lake street, agents:
 Braddock Wire Co., Rankin, Pa.
 Lambert & Bishop, Wire Fence Co., Joliet, Ill.
- M. A. MIHILLS, 166 Lake street, agent:
 Wetherald Wire Nail Co., Findlay, Ohio.
 Wm. Schollhorn & Co., New Haven, Conn.
 Sterling Wrench Co., Sterling, Ohio.
 Ellrich Hardware Mfg. Co., Plantsville.
- A. Y. McDONALD MFG. CO., 168 Lake street.
 Factory Dubuque, Iowa.—*Pumps and Plumbers' Supplies*. Also agents for Haines, Jones & Cadberry, Philadelphia.—*Plumbers' Supplies*.
- GEO. B. KERR, 208-210 Lake street, agent:
 Scoville Mfg. Co., Waterbury, Conn.—*Metal Specialties*.
- THE UPSON NUT CO., 232 Lake street, branch house.
 Factories Cleveland, Ohio, and Unionville, Conn.—*Nuts, Bolts and Carriage Hardware*.
- THE OSHKOSH PUMP CO., 154 Lake street, Eugene Smith, president.
 Factory at Oshkosh, Wis.—*Iron Pumps and Well Specialties*.
- H. H. & C. L. MUNGER, 142 Lake street, agents:
 E. C. Stearns & Co., Syracuse, N. Y.—*Door Hangers, &c.*
 Syracuse Twist Drill Co., Syracuse.
 Phoenix Caster Co., Indianapolis, Ind.
 A. F. Pike Mfg. Co., Pike's Station, N. H.—*Oil Stones*.
 Lufkin Rule Co., Cleveland, Ohio.
 A. M. Bristol, Rochester, N. Y.—*Registers*.
 Samson Cordage Works, Boston.
 Moore & Barnes Mfg. Co., Phoenix, N. Y.—*Specialties*.
 Hollenbeck Lock & Knob Co., Jordon, N. Y.
 Lovell, Tracy & Co., Hartford, Conn.—*Oil*.
 Climax Curry Comb Co., New York.
 F. A. Reiher, Chicago.—*Transom Lifters*.
 Wm. Gerwien, Chicago.—*Locks*.
 J. H. Brown & Co., Chicago.—*Hog Rings*.
 Michigan Wire Shovel Co., Niles, Mich.—*Picture Hangers*.
 The Brinkerhoff Co., Auburn, N. Y.
- MARINETTE IRON WORKS CO., 212 Lake street:
 Cameron Steam Pump Co., New York.
 Cleveland, Brown & Co., Cleveland.
 Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
 Hart Mfg. Co., Cleveland, Ohio.
 Mnfr's Governor Co., New York.
 Michigan Lubricator Co., Detroit.
 Detroit Lubricator Co., Detroit, Mich.
 Edinburg Pulley Co., Edinburg, Ind.
 Wiley & Russell Mfg. Co., Greenfield, Mass.
 Montgomery Brass Mfg. Co., Cleveland.
 Reliance Gauge Co., Cleveland.
 Taunton Crucible Co., Taunton, Mass.
 Bonney Vise Co., Clinton, Iowa.
 Josiah Gates & Son, Lowell, Mass.
 C. N. Coe, Worcester, Mass.
 Challenge Machinery Co., Philadelphia.
 Sterling Emery Wheel Co., New York.
 Star Machine Co., Buffalo.
 Newman Clock Co., New York.
 Jenkins Bros., New York.
 Celluloid Emery Wheel Co., New York.
 Holland & Thompson Mfg. Co., St. Paul.
 St. Paul Iron Co., St. Paul.
 Claffen Mfg. Co., Cleveland.
 Penberthy Injector Co., Detroit.
- W. MCARTHUR, 25 Lake street, manager Western branch,
 R. E. Dietz Co., New York.—*Lanterns*.
 Steam Gauge and Lantern Co., Rochester, N. Y.—*Lanterns*.
- HENRY A. TAYLOR, 19 Lake street, manager Western branch American Screw Co., Providence, R. I.
- HENION & HUBBELL, 55 and 57 North Clinton street, agents, Silver & Deming Mfg. Co., Salem, Ohio.—*Pumps*.
- H. S. WALKER, manager Western department Hall Duplex Steam and Power Pumps, 8 and 10 South Canal street.—*Pumps*.
- GREGORY & DONOVAN, agents, 154 Lake street.—*Hardware Specialties*.
- NELSON B. WILLIAMS, Rookery Building, agent:
 Hartman Steel Co., Beaver Falls.—*Wire, Wire Nails, Barb Wire, Steel, &c.*
 Apollo Iron and Steel Co., Apollo, Pa.—*Sheet Iron and Steel and Galvanized Iron*.
- CLIFFORD J. ELLIS, Phenix Building, agent:
 Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.—*Wire, Barb Wire, Steel, &c.*
- UNION INDURATED FIBRE CO., general Western office and warehouse, 45 to 49 Wabash avenue; A. H. Prescott, manager. Factories: Portland and Skowhegan, Me.; Watertown, Mass.; Mechanicsville, N. Y.; Oswego, N. Y.; Lockport, N. Y., and Winona, Minn.
- FAIRBANKS, MORSE & Co., Lake and La Salle streets, branch house, for sale of Fairbanks' Scales. Sole agents for Eclipse Wind Mills, Sheffield Hand Cars, &c.; Hancock Inspirator, Smith-Vaile Pumps, Williams' Engines, Chandler & Taylor Engines, Snell & Maharg, Standard Electric Health Lift Co., &c.
- THE ANDREWS BROS. CO., 53 Dearborn street, John McLauchlan, manager Western office. Works at Haselton, Ohio.—*Sheet Iron, Bars, Bands, Hoops and Pig Iron*.
- T. S. CASEY & Co., 115 Dearborn street, agents for manufacturers of Steel Nails, Wire Nails, Roofing, &c.
- W. G. TALCOTT, 89 Lake street, agent for Alfred C. Rex & Co., Variety Iron Works, Philadelphia.
- J. W. CROSS, 115 Dearborn street, secretary H. C. Hart Mfg. Co., Detroit.—*Car Hardware*.
- WASHBURN & MOEN MFG. CO., 107 and 109 Lake street, H. B. Cragin, agent. Works at Worcester, Mass.—*Plain and Barb Wire, Bale Ties, &c.*
- HENRY DRISTON & SONS, 259 Randolph street, H. D. Nicholls, manager. Works at Tacony, Pa.—*Saws*.
- C. K. LUCE, 154 Lake street, agent:
 Globe Nail Co., Boston.—*Horse Nails*.
- CHARLES HAWKINS, Phenix Building, agent for:
 Brown, Bonnell & Co., Youngstown, Ohio.—*Nails, Bar Iron, &c.*
- PUTNAM NAIL CO., 235 Lake street, E. Brubaker manager.—*Horse Nails*.
- D. R. SPERRY & Co., 235 Lake street. Works at Batavia, Ill.—*Hardware Specialties*.
- S. L. BIGNALL HARDWARE CO., 233 Lake street. Works at St. Charles, Ill.—*Sad Irons, &c.*
- W. & B. DOUGLAS, 197 Lake street, Works at Middletown, Conn.—*Pumps*.
- M. T. MILES & SON, Phenix Building, agents for:
 Anderson, Du Puy & Co., Pittsburgh; John C. Schmidt, York, Pa.; also represent manufacturers of Nails, Springs, Carriage Axles, &c.—*Steel Chains*.
- A. GUSTORF, 92 La Salle street, agent for manufacturers of Hardware Specialties.
- JOHN A. ROEBLING'S SONS COMPANY AND NEW JERSEY WIRE CLOTH CO., 171 and 173 Lake street, George C. Bailey, manager. Works at Trenton, N. J.—*Wire, Wire Rope, &c.*
- GOULDS & AUSTIN, 167 and 169 Lake street, agents for:
 Goulds Mfg. Company, Seneca Falls, N. Y.—*Iron Pumps, &c.*
- P. HAYDEN SADDLERY HARDWARE CO., 45 and 47 Lake street. Works at Columbus, Ohio.
- W. A. COMSTOCK, 31 Lake street, manufacturers' agent for sale of Hardware Specialties.

W. H. WALBRIDGE, 31 Lake street, manufacturers' agent for sale of Hardware Specialties.

KILMER MFG. Co., 543 State street. Works at Newburg, N. Y.—*Bale Ties*.

JONES & LAUGHLINS, West Lake and Canal streets. Works, Pittsburgh.—*Nails, Bars, Sheets, &c.*

WM. E. STOCKTON, 16 West Lake street, agent for:
Moorehead McCleane Co., Long & Co. and Singer, Nimick & Co., Pittsburgh.—*Galvanized Iron, Bar Iron, Steel, &c.*

JAMES W. ROSS, 123 Dearborn street, agent:
Whitaker Iron Co., Wheeling, W. Va.—*Sheet Iron*.

W. S. KESSLER & Co., 115 Dearborn street, agent for:
Toledo Bolt and Nut Co., Toledo, Ohio.—*Bolts, Nuts, Bars, &c.*

J. P. DABNEY, 239 and 241 Lake street, agent:
Taunton Tack Co., Taunton, Mass.—*Tacks, Nails and Rivets*.

W. M. MOONEY & Co., Western office 241 Lake street; factories, Montreal, Canada, and Ausable Chasm, Essex County, N. Y.—*Horse Nails*.

CHARLES HOWARD, 226 and 228 Lake street, manager Chicago office:
Deane Steam Pump Co., Holyoke, Mass.—*Pumps*.

A. W. KINGSLAND, 142 Lake street, general agent:
Ausable Horse Nail Co., New York.—*Horse Nails*.

WM. T. EGAN, 40 Dearborn street, agent:
P. L. Kimberly & Co., Sharon, Greenville and New Castle.—*Iron and Nails*.
Geo. W. Johnson, New Castle, Pa.—*Plates and Sheets*.
Ætna Iron Works, Limited, New Castle, Pa.—*Nails*.

W. H. SILLS, 116 Lake street, agent:
Palmer Mfg. Co., New York.
Matthai, Ingram & Co., Baltimore.
James Hill Mfg. Co., Providence.
Fred. J. Meyers Mfg. Co., Covington, Ky.
New York Stamping Co., Brooklyn.

N. D. PRATT, 91 Lake street, Western agent:
Cleveland Rolling Mill Co., Cleveland.—*Iron, Steel, Wire, &c.*
Union Steel Screw Co., Cleveland.—*Screws and Tacks*.

KIECKHEFER, BARTLING & Co., 149 Lake street, Chicago, branch Kieckhefer Bros., Milwaukee.—*Tinware*.

BORDEN, SELLECK & Co., 48 and 50 Lake street, general agents Howe Scales and Troemner Scales.—*Scales*.

W. A. TOLES, 88 Lake street, manager Western Wheeler Reflector Co., Boston and Philadelphia.—*Lamps, Lanterns, &c.*

J. WHITCOMB COTTON, 88 Lake street:
American Tube Works, Boston, Mass.—*Copper Tubes*.

CUTLER, WOODROUGH & Co., 19 Lake street, Western agents.
Nashua Lock Company, Nashua, N. H.
Lockwood Mfg. Co., South Norwalk, Conn.
Dibble Mfg. Co., Trenton, N. J.
Yale Caster Co., New Haven, Conn.
Underhill Edge Tool Co., Nashua, N. H.
Woodrough & McParlin, Cincinnati.
Henry Cheney Hammer Co., Little Falls, N. Y.
Arcade File Works, Sing Sing, N. Y.
C. J. Kimball & Son, Bennington, Vt.
Hobart B. Ives & Co., New Haven.
C. E. Jennings & Co., New York.
Chicago Sewing Machine Co., Chicago.

CHAS. H. BESLEY & Co., 175 and 177 Lake street, agents:
Buchanan, Bolt & Co., Holyoke, Mass.—*Brass Wire Cloth*.
Kearney & Foote Co., New York.—*Files*.
W. F. & Jno. Barnes Co., Rockford, Ill.—*Lathes*.
Sigourney Tool Co., Hartford, Conn.—*Machinery*.
Hendricks Bros., New York.—*Copper*.
Russell & Erwin Mfg. Co., New York.—*Machine Screws*.
Boston Blower Co., Boston, Mass.—*Exhausts and Blowers*.
Diamond Machine Co., Providence, R. I.—*Grinding Machinery*.
Sebastian, May & Co., Cincinnati, Ohio.—*Machinery*.
Magnolia Anti-Friction Metal Co., New York.—*Babbitt Metal*.
S. Ashton Hand Mfg. Co., Toughkenamon, Pa.—*Lathes*.
Prentiss Tool and Supply Co., New York.—*Shapers*.
Hanson, Van Winkle & Co., Newark, N. J.—*Electro Platers' and Polishers' Supplies*.
Brown & Sharpe Mfg. Co., Providence, R. I.—*Standard Gears*.
Celluloid Varnish Co., Newark, N. J.—*Lacquers*.

WELLS GOODHUE, 115 Dearborn street, agent:
Hopkins & Dickinson Mfg. Co., Brooklyn, N. Y.—*Locks and Builders' Hardware*.

GEO. G. SPENCER, 115 Dearborn street, agent:
Laughlin Nail Co., Wheeling, W. Va.—*Nails and Spikes*.
Ætna Iron and Steel Co., Bridgeport, Ohio.—*Bars, Angles, &c.*

J. E. DAVIS & Co., 115 Dearborn street, agent:
Tower & Lamont, Rochester, N. Y.—*Razor Straps*.
S. Draper & Sons, Troy, N. Y.—*Fish Lines*.
E. Blair, Bucyrus, Ohio.—*Hog Ringers*.
Chattanooga Tool Co., Chattanooga, Tenn.—*Hoes, Shovels, &c.*
I. F. Force, New Albany, Ind.—*Handles*.
Union Soapstone Co., Franconstown, N. H.—*Foot-Warmers*.
Starr Bros. Bell Co., E. Hampton, Conn.—*Small Bells*.
Cummings & Hosack, Fredericktown, Ohio.—*Farm Bells*.
Schencks Adj. Fire Back Co., Chicago.—*Fire Backs, Screw Cases, &c.*
Empire Knife Co., W. Winsted, Conn.—*Shears and Corkscrews*.
Painesville Metal Binding Co., Painesville, Ohio.—*Binding*.
A. W. Bishop, Berea, Ohio.—*Animal Pokes*.
Gibbs Lawn Rake Co., Canton, Ohio.—*Rakes and Post-Hole Diggers*.

C. E. TRIPP, Phenix Building, agent for HP Nail Co., Cleveland.—*Wire Nails*.
A. French Spring Co., Pittsburgh.—*Springs*.

SAMUEL E. BROWN, Phenix Building, agent for Cleveland Hardware Co., Cleveland.—*Wagon and Carriage Hardware*.

The Rights of Employees.

A writer in a recent issue of the *Merchants' Review* presents the following views on the treatment which should be accorded salesmen in the employ of retail merchants in all branches of trade:

As a retail business of any magnitude cannot be conducted without the help of clerks, and as the proprietor must depend upon these assistants in a large measure as his representatives, it follows that the treatment of these important adjuncts of

the retail business must be a matter for serious consideration with the merchant. Clerks have it in their power to increase the business of their employers by proper attention to the wants of their patrons and those small acts of politeness to the fair sex, which are as a rule so highly appreciated, or they can drive away the very best class of customers by surly or inattentive conduct, and at the same time escape reproof because the fact does not come to the notice of the employer. Some young men are so incapable naturally that the most rigid training can never fit them for a position behind the counter, though they may shine in other occupations. The merchant employing a large staff of clerks sometimes finds specimens of each class among them—the ill-tempered, the thoughtless and the willing but incapable. Then it is that his capacity for management, his executive ability and knowledge of human nature must come into play, and the worthless clerks be weeded out, while the capable but thoughtless are reproved and instructed.

The easiest plan at first thought would seem to be summary dismissal of every assistant not first class, but the experienced retainer is aware of the difficulty of obtaining a staff of good assistants ready to his hands, and knows that he must train them himself in many cases. Some clerks are ruined by harsh and tyrannical treatment, others by slack discipline, but the employer who is firm yet considerate of the rights of his employees should have little trouble in protecting his business against the injury resulting from the shortcomings complained of by many retailers. Constant vigilance is necessary or the merchant will never detect the faults that give offence to his patrons, but he ought not to expect too much from his assistants, as for instance that they will take the same interest in the business that he does himself. They ought, of course, to do so, but human nature is such that hardly one in a thousand will be found perfect in this respect. When a merchant finds his clerks willing, industrious, honest and affable to his patrons, he should by all means cherish them, for he is more fortunate than the majority of his fellow merchants. The minor faults of young men can generally be eradicated by careful training, which, if successful, will repay the dealer for his trouble. In all cases, kind and considerate, but firm treatment gives the most successful results, and it is not to be wondered at that employers who adopt a different policy are the loudest in complaint of the faults of the whole race of clerks.

The H. C. Frick Coke Company, of Pittsburgh, have purchased within the last few days a valuable piece of property at the corner of Garrison and Penn avenues, in that city. It is the intention of the firm to erect on the site a costly and extensive office building, the lower part to be used by the H. C. Frick Coke Company as offices, while the upper floors will be rented out for the same purposes. Work on the building will probably be commenced in a short time.

The Adams Coke Oven Bottom Mfg. Company was organized in Pittsburgh last week, with a capital stock of \$50,000, and a charter will at once be applied for. The object of the company is the manufacture of a false bottom for coke ovens, patented by Mr. A. Adams. The bottom is to be opened by hydraulic pressure, and by its aid it is claimed that one man will be able to draw 40 ovens per day. At present the most that one man can draw in a day is four ovens. The company propose charging \$15 per year royalty for the use of their invention. The members of the company are A. Adams, Lehman Suear, John Donahoe, John Adams and Samuel Truby.

The Eureka Spring-Toothed Harrow.

This harrow is manufactured by the Eureka Mower Company, Utica, N. Y. It is illustrated in the cut, Fig. 1, given herewith. The manufacturers call atten-

tion to its light draft, which is not, however, at the expense of strength or durability, as the channel form of steel used in the draft bars is referred to as giving it exceptional strength. They also claim that the harrow has light draft, from the fact the frame is 3 inches higher from the ground than other harrows, and will not bury itself. The two parts of the harrow are hinged together with an oblong loop upon one side and an eye or stud upon the other, fastened with a spring key and

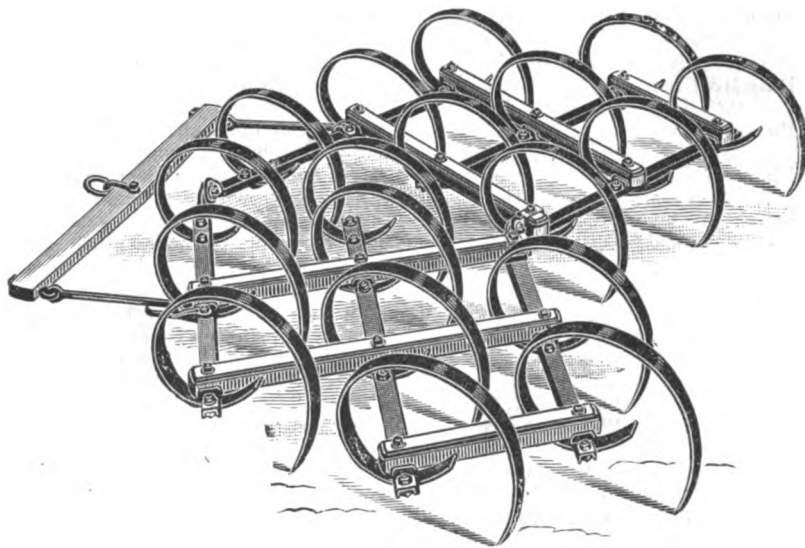


Fig. 1.—The Eureka Spring-Toothed Harrow.

ment of the teeth, so that in removing one or all of the teeth the frame remains the same.

ent of the teeth, so that in removing one or all of the teeth the frame remains the same.

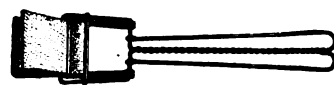
Lawn Rakes.

We represent herewith the Champion Wheel and Champion Reversible Lawn Rakes, which are put on the market

teeth, and of such a form as to prevent their tearing the sod. The length of the teeth and the width of the rake are also alluded to. The point is also made that they will not rust, as all the metal parts are galvanized. Fig. 1 represents the Champion wheel rake with reversible handle. The manufacturers explain that the handle, being reversible, gives the rake the desirable feature of being both a grass and a leaf rake, the pointed teeth being adapted to grass and the back rake reversed on handle forming a set of bowed teeth principally adapted to raking leaves in the fall of the year. The wheel is alluded to as adding to the ease of working the rake, also protecting the sod. Fig. 2 represents a similar rake, the wheel being omitted and the handle differently attached. The rake, as shown, is reversible and the teeth on either side can be used. Its special adaptation as a lawn rake is mentioned by the manufacturers, as well as the low price at which it is offered to the trade.

Pan and Griddle Greaser.

The accompanying illustration represents an article put on the market by Woods, Sherwood & Co., Lowell, Mass.



Pan and Griddle Greaser.

It is designated as Mrs. Gray's Patent Pan and Griddle Greaser. As indicated in the cut, it is made of wire and is about 7½ inches in length. It is so constructed as

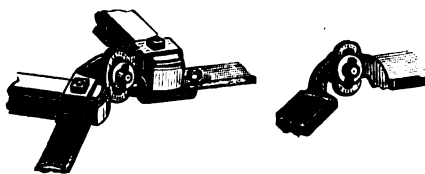


Fig. 2.—Form of Hinge.

washer, Fig. 2. The advantage of this joint is referred to as being that upon rough or uneven ground either half of the harrow is conformable to the surface. The tooth is fastened with a malleable-iron clip, shown in Fig. 3, by means of two bolts, the tooth seated upon the walls of the channel bar and the clip spanning it and fitted into the channel, but not resting upon the bottom of it. When the bolts are drawn the clip secures the tooth

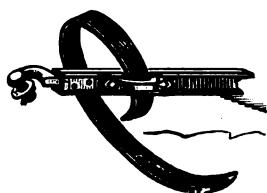


Fig. 3.—Method of Attaching Teeth.

firmly. In fastening the frame together malleable-iron saddles are used, in which the draft bars and wood cross-beams are secured by bolts. These saddles have flanges upon the upper and lower sides to take the channel steel draft bar and the wood pieces at each intersection. This

by the Champion Lawn Rake Company, Canton, Ohio. The teeth of these rakes are made of steel wire and are

to hold firmly the greaser proper and permit the substitution of a new one when desired. It is referred to by the manu-

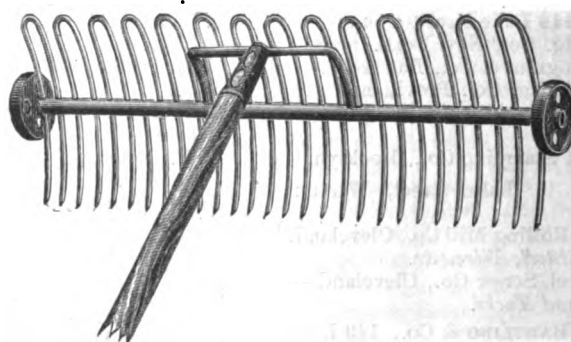


Fig. 1.—Champion Wheel Lawn Rake.

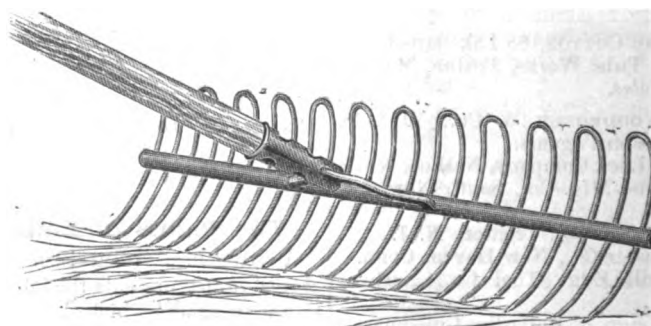


Fig. 2.—Champion Reversible Lawn Rake.

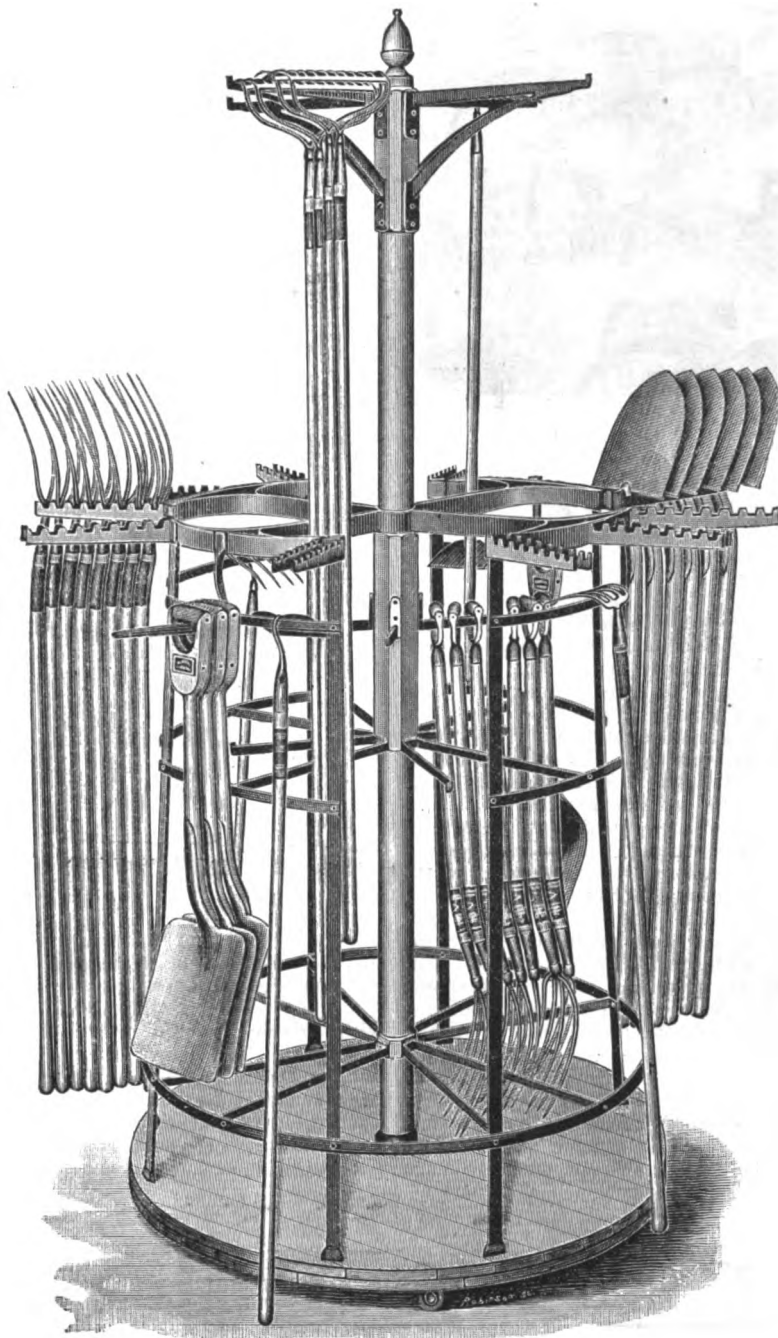
inserted, it will be observed, through a tube, in which they are securely fastened. They are made of the shape represented to prevent the clogging of the

facturers as giving satisfaction and serving a convenient purpose, making it a desirable article in the kitchen and securing a ready sale.

Herrick's Patent Tool Rack.

The accompanying illustration represents Herrick's Patent Tool Rack, which is manufactured by F. A. Herrick & Co., 228 Second street Jackson, Mich. This

12 Long Shovel Handles, 12 Long Spade Handles, 12 Long Rake Handles, 12 Hoe Handles, 12 Long Manure-Fork Handles, 12 Long Hay-Fork Handles, 8 D-Fork Handles and 8 D-Shovel Handles. It will thus be seen that the rack accomodates a



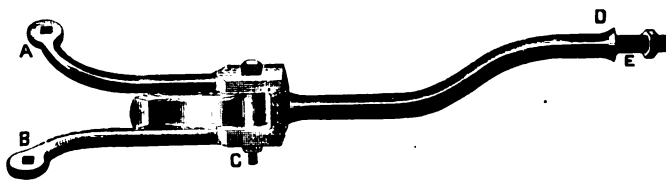
Herrick's Patent Tool Rack.

rack is made entirely of iron, except the posts and platform, and is mounted with heavy truck casters so that it can be moved at will to any part of the store. The shovel and fork brackets slip into a dovetail on the rack, and can be interchanged at will by simply lifting out of socket. They are notched, it will be observed, on top so that each tool is held securely in its space. The handles are intended to stand on end on the platform, and are held in place by the V-shaped brackets. The rack is described as strong, thoroughly screwed and bolted together, the woodwork being neatly painted a bright red, and all ironwork japanned, making it very attractive in appearance. The room necessary for the accomodation of the rack is a space about 5 feet square. The capacity of the rack is stated to be as follows: 32 D-Handle Shovels, 12 Long Handle Shovels, 48 Long Handle Forks, 16 D-Handle Forks, 24 Rakes, 36 Hoes, 18 Potato Hooks, 18 Manure Hooks,

large assortment of the goods for which it is intended.

Heavy Sleigh-Shaft Coupling.

The accompanying illustration represents a new heavy sleigh shaft coupling,



Heavy Sleigh Shaft Coupling.

which is put on the market by Butts & Ordway, 145 and 147 Pearl street, Boston, Mass. Its general construction is clearly shown in the cut. Special attention is called to the fact that it is made of heavy

iron of the best quality and well-finished and fitted. The couplings are made so that they can be fitted to almost any heavy sleigh or single or double runner pung. In order to give a clear idea of the size and adaptation of the coupling we would add that from A to B is 8 inches, from A or B to C, 6½ inches, from C to D 10 inches, from A or B to D 15½ inches, diameter at E 1½ inch.

Wing's Improved Pail Ear.

I. A. Weston & Co., Syracuse, N. Y., are putting on the market Wing's Improved Pail Ear, which is represented in the accompanying cut, Fig. 1, its use being indicated in Fig. 2. The ear is



Fig. 1.—Wing's Improved Pail Ear.

formed of bent metal and perforated as shown in Fig. 1. The object of this pail ear is to provide a support by which the pail can be held while milking, thereby preventing it from coming in contact with the ground and also guarding against its being tipped over. The curved arm projects outward away from the pail and forms

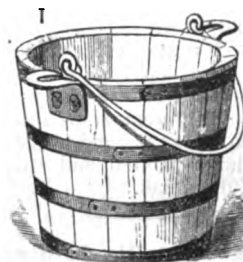


Fig. 2.—Wing's Pail Ear Applied.

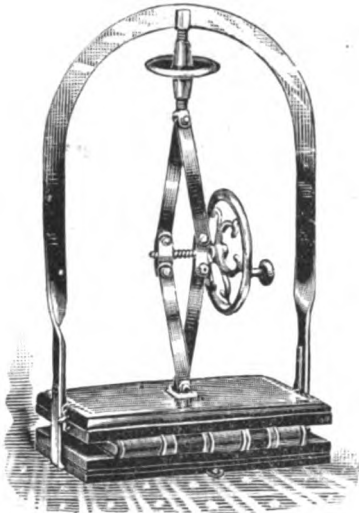
a support by means of which the pail may be held in position between the knees of the milkman without the necessity of much pressure on its sides.

The fate of the railway tunnel between Denmark and Sweden has practically been decided, the joint Swedish-Danish Commission appointed to report upon the project having recommended its rejection, at all events in its present form. The proposal for a tunnel was made by a syndicate of French financiers, and provided for a railway tunnel from a point in the island of Amager, near Copenhagen, to a point near Malmo, on the Swedish coast, the ap-

plicants for the concession maintaining that such a connecting link between the railway systems of Denmark and Sweden could not fail to develop the traffic between the two countries.

The Improved Easy Copying Press.

This article is made by the Easy Copying Press Company, Detroit, Mich., for whom Danforth & Pike, Boston, Mass., are agents. The bed is made of hardwood, 1½ inches thick, provided with wrought angle irons on each end to strengthen it, the follower being treated similarly. The arched frame is steel, thus giving the requisite strength, and the top screw piece riveted to the frame is forged steel. The four jointed pieces and other connections are wrought iron. The man-



The Improved Easy Copying Press.

ufacturers make the point that thus there is no cast iron about the press except the wheels. It will be observed that the press is easily adjusted to books of different thickness. Its strength, simplicity and the ease with which it is worked are the advantages which are especially mentioned. It is made in different sizes, ranging from 10 x 13 to 18 x 22, and finished either painted plain, painted and striped, half nickel or full nickel.

New Metallic Lathing.

Prominent among the exhibits at the American Institute Fair, New York, now in session, is a miniature building, lathed and plastered, in the construction of which is employed what is known as the Hayes System of Metallic Lathing, Furring, &c., an invention that has recently

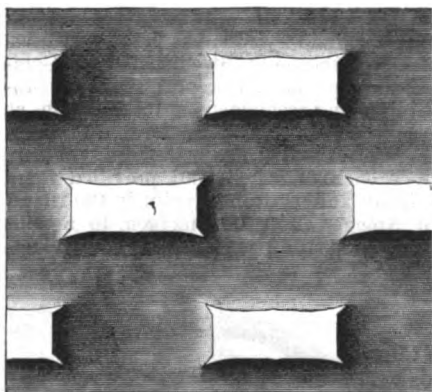


Fig. 1.—Back Elevation of a Portion of Perforated Sheet for Lathing.

been introduced by George Hayes, the well-known manufacturer of skylights and other glazed structures, of 71 Eighth avenue, New York. From even casual inspection it is evident that the improvement possesses more than ordinary merit.

Briefly, the invention consists of a sheet of iron or other metal perforated in such a form as to provide holes for the clinch of the plaster, and with burrs turned outward in a way to use the punching, to still further hold

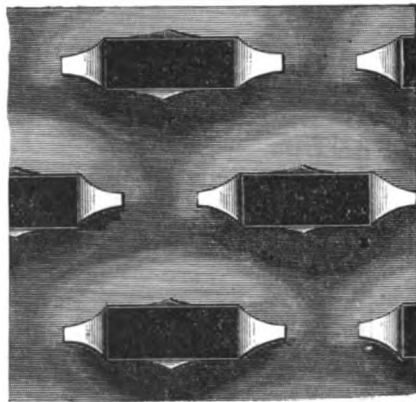


Fig. 2.—Elevation of Front of Portion of Perforated Sheet.

the mortar in place. Referring to the engravings, Fig. 1 shows a back elevation of the lathing, and indicates how the holes are punched. Fig. 2, on the other hand, is a section of the front elevation of a sheet of the lathing. The lathing is manufactured out of sheets of metal 40 x 96 inches or less in size, over the surface of which, at near intervals, are openings ½ inch wide by ¾ inch long, produced by puncturing, as already mentioned. The flanges around the openings are pressed forward and curled outward, forming lips or hooks which clinch or hold the mortar to the surface of the sheets, while at the base of each opening there is formed a matrix into which the mortar is pressed, and by which perfect dovetailed clinches or bonds are obtained. The process, it is pointed out, imparts to the sheets an undulated surface, giving additional strength thereto. The mortar or plastering material is spread over the surface of the sheets, embedding the lips and hooks and filling the matrix, thereby, it is claimed, permitting a degree of coalescence which insures perfect and substantial work. The inventor points out that there is an entire freedom from expansion or other organic action, which would be liable to disrupt, strain or in any

being hard finished. In connection with this invention Mr. Hayes has perfected various architectural features which will be appreciated by builders in general. The lathing sheets can be readily bent to internal and external angles, and when so bent adapt themselves to any form of combined lathing, furring and screeding, and also to meet certain features in architecture, such as pilasters, columns, niches, groins, cornices, bases, angles, trimmings, &c. In the pamphlet which the inventor has issued, several engravings are presented which illustrate this feature. One application of this improvement, which will be very generally appreciated by those of our readers who have to do with office buildings and similar structures, is in the construction of fire-proof partitions.

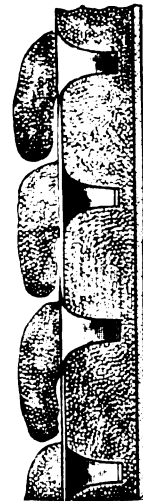


Fig. 4.—Vertical Section through Finished Portion.

In his description, the inventor says that this system of lathing admits of the construction of strong partitions of from 1½ inches thickness, upward, with double-plastered faces. The partitions are made by forming in the lathing sheets which, by virtue of the peculiar punctures, already have rigidity, a series of ribs such as are made for furring, and which are secured to each other back to back, and, when necessary for an



Fig. 3.—Horizontal Cross Section Corresponding to the Above.

other way injure the bond. Cracking or falling away of the surface of the wall or ceiling, under any circumstances, it is claimed, is impossible. So solid is the coating that it can only be removed by picking it off in particles. Among the advantages to which attention is prominently directed we note the following: Less mortar is used than upon any other fire-proof lathing; the mortar may be applied stiffer than is the ordinary practice; scratch coating is entirely dispensed with; for one coat work this lathing affords an effectual finish; less hair, and shorter hair than commonly employed, may be successfully used. It is claimed, further, that by plastering with a good quality of gauged material a good result may be obtained without any hair. Figs. 3 and 4 of the engravings show a section of the lathing, a portion being covered with the first coat, and a portion of this, in turn,

increase in strength, reinforced with a framework of band or bar iron or with angle or T-iron. The lathing is secured to the frame by wire or suitable clamps. The plastering on both sides aids in binding the whole together, so that very substantial walls are the results. The sheet, punctured as above described, are furnished in plain iron dipped in a lime coating, or dipped in asphaltum, or galvanized. As lime is a well-known preservative of iron, it is claimed that plain iron with a coating of lime is the most advantageous to use. The merchantable size of the sheets is 30 x 96 inches. It is claimed that the labor in applying this material to the walls is very much less than what is required in putting in plaster, wooden lathing, and it is further claimed that the employment of this material greatly adds to the strength of the building, in the fact that it braces and stiffens the walls.

CURRENT HARDWARE PRICES.

DECEMBER 5, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers. at the figures named.

Ammunition.

Caps. Perfection, 7000—	
Blacks & Goldmark's	
F. L. Waterproof, 1-10's	50¢
M. B. Trimmings, 1-10's	55¢
M. B. Ground Edge, Central Fire, 1-10's	70¢
Double Waterproof, 1-10's	1.40
Musket Waterproof, 1-10's	50¢
S. D.	25¢
S. B.	30¢
Union Metallic Cartridge Co.	
F. O. Trimmings	50¢
F. L. Ground	55¢
Gen. Fire Ground	70¢
Double Waterproof	1.40
Double Waterproof, 1-10's	1.40
S. B. Genuine Imported	45¢
Blay's E. B.	54¢
Blay's D. Waterproof, Central Fire	51.50

Cartridges	
Rim Fire Cartridges	dis 60¢ & 25¢
Rim Fire Military	dis 15¢ & 25¢
Central Fire Pistol and Rifle	dis 25¢ & 25¢
Central Fire, Military & Sporting	dis 15¢ & 25¢
Blank Cartridges, except 22 and 32 cal., an additional 10% over above discounts	
Blank Cartridges, 32 cal.	\$ 75, dis 25¢
Blank Cartridges, 32 cal.	\$ 50, dis 25¢
Primed Shells and Bullets	dis 15¢ & 25¢
E. B. Cape, Round Ball	\$1.75, dis 25¢
E. B. Cape, Conical Ball, Swaged	\$2.00, dis 25¢

Primers	
Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells)	\$1.00, dis 25¢
All other Primers, all sizes	\$1.20, dis 25¢

Shells	
First quality, 4, 8, 10 and 12 gauge	dis 25¢ & 10¢ & 25¢
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30¢ & 10¢ & 25¢
Star, Club, Rival and 10 gauge, 30 list	dis 35¢ & 10¢ & 25¢
Climax Brands, 12 gauge, 30 list	\$10 2
Star, Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢ & 10¢ & 25¢
Seibold's Combination Shot Shells	dis 15¢ & 25¢
Brass Shot Shells, 1st quality	dis 60¢ & 25¢
Brass Shot Shells, Club, Rival, Climax	dis 65¢ & 25¢
A. B. & C. Co., I. X. L., 10 & 12 gauge	dis 40¢ & 25¢
A. B. & C. Co., "Special", 15 gauge, dis 30¢ & 10¢ & 25¢	
A. B. & C. Co., "Special", 10 & 12 gauge, dis 40¢ & 10¢ & 25¢	
Fowler's Patent, 10 & 12 gauge, \$ 100	\$5.75

Shells Loaded	
List No. 19 1887	dis 20¢ & 10¢

Wads	
U. M. C. & W. R. A.—B. E. 11 up	\$2.00
U. M. C. & W. R. A.—B. E. 9&10	\$3.00
U. M. C. & W. R. A.—B. E. 7&8	\$3.00
U. M. C. & W. R. A.—P. E. 11 up	\$1.10
U. M. C. & W. R. A.—P. E. 9&10	\$4.00
U. M. C. & W. R. A.—P. E. 7&8	\$4.00
Blay's E. B. 11 up	\$1.75
Blay's E. B. 9 & 10	\$2.50

Anvils	
Anvil, Eagle Anvil	\$ 105, dis 30¢ & 25¢
Peter Wright's	94¢
Armstrong's Mouse Hole	35¢
Armstrong's Mouse Hole, Extra	114¢
Trenton	94¢
Wilmington's	94¢
J. & H. Case, Patent Solid	114¢

Anvil Pins and Drills	
Wilmington's	\$13.00, dis 30¢
Cheney Anvil and Vise	dis 25¢
Allen Combined Anvil and Vise	\$5, dis 40¢ & 10¢
Moore & Barnes Mfg. Co.	dis 33¼¢

Apple Parers	
Advance	\$ doz. \$4.75
Antrim Combination	\$ doz. 5.50
Baldwin	\$ doz. 5.25
Champion	\$ doz. 7.25
Eureka, 1888	\$ doz. 17.00
Family Bay State	\$ doz. 12.00
Gem	\$ doz. 5.25
Gold Medal	\$ doz. 4.00
Hudson's New '88	\$ doz. 3.75
Ideal	\$ doz. 4.75
Improved Bay State	\$ doz. 30.00
Little Star	\$ doz. 5.00
Monarch	\$ doz. 13.00
New Lightning	\$ doz. 5.50
Orion	\$ doz. 4.00
Peen	\$ doz. 4.00
Perfection	\$ doz. 4.00
Pomona	\$ doz. 4.00
Rocking Table	\$ doz. 6.00
Turntable	\$ doz. 4.50
Victor	\$ doz. 13.50
Waverly	\$ doz. 4.50
White Mountain	\$ doz. 4.50
72	\$ doz. 4.25
75	\$ doz. 5.75
78	\$ doz. 6.50

Angers and Bits.

Douglas Mfg. Co.	
Wm. A. Free & Co.	
Humphreys & Mfg. Co.	
French, Swift & Co. (F. H. Beecher)	
Cook's, Douglas Mfg. Co.	dis 55¢
Cook's, New Haven Copper Co.	dis 50¢ & 10¢ & 50¢ & 10¢ & 25¢
Ives' Circular Lip	dis 60¢
Patent Solid Head	dis 30¢
C. E. Jennings & Co., No. 10, extension Up	dis 40¢
C. E. Jennings & Co., No. 30	dis 60¢
C. E. Jennings & Co., Anger Bits, in fancy boxes	dis 30¢
W. set, 33¼ quaters, No. 5, 35; No. 35, 35	dis 30¢
Lowie's Patent Single Twist	dis 45¢
Lowell Jennings' Angers and Bits	dis 25¢
Imitation Jennings' Bits (new first)	dis 60¢ & 60¢ & 25¢
Pugh's Black	dis 30¢
Car Bits	dis 50¢ & 10¢ & 60¢
McCommedieu Car Bits	dis 15¢ & 10¢
Forster Pat. Anger Bits	dis 10¢
Hollow Angers	
Ives	
French, Swift & Co.	dis 25¢ & 10¢
Douglas	dis 25¢ & 10¢
Bennett's Adjustable \$ doz. 245	dis 40¢ & 10¢
Stearns	dis 30¢ & 10¢
Ives' Expansive, each \$4.50	dis 60¢ & 10¢
Universal Expansive, each \$4.50	dis 50¢
Wood's	dis 25¢ & 25¢ & 10¢

Compressive Bits	
Clark's small, 118; large, 300	dis 35¢ & 25¢ & 5¢
Ives' No. 4, per doz.	dis 35¢ & 40¢
Swan's	dis 40¢
Stearns' No. 1, 150; No. 2, 300	dis 35¢
Stearns' No. 3, 445	dis 30¢
Double Cut	
Common	\$ gross \$2.75 @ \$3.25
Diamond	\$ doz. \$1.10, dis 25¢ & 10¢
"Bee"	dis 25¢ & 25¢ & 5¢
Double Cut, Shepardson's	dis 45¢ & 45¢ & 5¢
Double Cut, Ct. Valley Mfg. Co.	dis 30¢ & 10¢
Double Cut, Hartwell's, \$ gro.	dis 25¢
Double Cut, Douglas	dis 40¢ & 10¢
Double Cut, Ives	dis 60¢ & 60¢ & 25¢

344 Stock Drills	
Standard	dis 50¢ & 10¢ & 25¢
Cleveland	dis 50¢ & 10¢ & 25¢
Syracuse, for metal	dis 50¢ & 10¢ & 25¢
Syracuse, for wood (wood list)	dis 30¢ & 30¢ & 25¢
Williams' or Holt's, for metal	dis 40¢ & 10¢ & 10¢
Williams' or Holt's, for wood	dis 40¢ & 10¢

Ship Augers and Bits	
L'Hommedieu's	dis 15¢ & 10¢ @ 15¢ & 10¢ & 25¢
Watrous's	dis 15¢ & 10¢ @ 15¢ & 10¢ & 25¢
Small's	dis 15¢ & 10¢ @ 15¢ & 10¢ & 25¢
Small's Ship Auger Pat'n Car Bits	dis 15¢ & 10¢ @ 15¢ & 10¢ & 25¢

Awl Hatts	
Sewing, Brass Ferrule	\$3.50 \$ gro—dis 45¢ & 10¢
Patent Sewing, Short	\$1.00 \$ doz—dis 40¢ & 10¢
Patent Sewing, Long	\$1.20 \$ doz—dis 40¢ & 10¢
Patent Peg, Plain Top	\$1.00 \$ gro—dis 45¢ & 10¢
Patent Peg, Leather Top	\$1.20 \$ gro—dis 45¢ & 10¢

Awls, Brad Sets, &c.	
Awls, Sewing, Common	\$ gross \$1.70—dis 35¢
Awls, Shouldered Peg	\$ gross \$2.45—dis 40¢ & 10¢
Awls, Patent Peg	\$ gross \$3.60—dis 40¢ & 10¢
Awls, Shouldered Brad	\$2.70 \$ gross—dis 35¢
Awls, Handled Brad	\$7.50 \$ gross—dis 45¢
Awls, Handled Scratch	\$7.50 \$ gross—dis 35¢ & 10¢
Awls, Hooked Scratch	\$1.50 \$ doz—dis 25¢ & 30¢

Awls and Tool Sets	
Allen's Sets, Awls & Tools, No. 30, \$ doz. \$10—dis 55¢ & 10¢	
Tray's Ad. Tool Hds., Nos. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢ & 25¢ & 10¢

Miller's Falls Adj. Tool Hds., Nos. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢ & 25¢ & 10¢
Henry's Combination Hds.	\$ 1.30, dis 30¢
Brad Sets, No. 42, \$10.50, No. 42, \$11.50, dis 70¢ & 10¢ & 25¢	
Brad Sets, Stanley's Excelsior, No. 1, \$7.50	dis 30¢ & 10¢
Brad Sets, Stanley's Excelsior, No. 2, \$4.00	dis 30¢ & 10¢
Brad Sets, Stanley's Excelsior, No. 3, \$5.50	dis 30¢ & 10¢

Axes	
Makers' and Special Brands—	
First quality	\$ doz. \$5.00 @ \$5.50
Others	\$ doz. \$5.50 @ \$5.75
Axle Greases	
Fraser's, in bulk	Keg \$ 4.40; Pail \$ 4.50 net
Fraser's, in boxes	\$ gross \$5.50
Dixon's Everlasting, in bxs.	\$ doz. 1.30, dis 30¢
Dixon's Everlasting, 10 bails, each 5¢	
Lower grades, special brands	\$ kro \$5.50 @ \$7

Axles	
No. 1, 40 & 44¢; No. 2, 54 & 54¢	
No. 7 to 18	dis 50¢ & 25¢
No. 19 to 23	dis 60¢ & 10¢ & 10¢ & 70¢
National Wrought Steel Tubular Self-Oiling	
Standard Farm (1 to 5) and Special Farm (All to A5)	dis 55¢
Less than 10 sets	dis 55¢
Over 10 sets	dis 55¢
X Strong Exp. (6 to 9), & XX Strong Truck (10 to 15)	dis 10¢
Less than 10 sets	dis 10¢
Over 10 sets	dis 10¢ & 25¢

Bag Holders	
Spring's Pat., \$ doz 115	dis 60¢
Balances—Spring Balances	dis 50¢
Common	\$ doz. \$1.50—dis 50¢
Challinor's Spring Balances	dis 50¢
Challinor's Circular Spring Balances	dis 60¢

Bells	
Light Brass	dis 70¢ & 10¢
Extra Heavy	dis 60¢ & 10¢
White Metal	dis 60¢ & 10¢
White Metal	dis 60¢ & 10¢
Globe (Cone's Patent)	dis 25¢ & 10¢ & 35¢

Door	
Gong, Abbe's	dis 33¼¢ & 10¢
Gong, Yankee	dis 45¢ & 10¢
Gong, Barton's	dis 40¢ & 10¢ & 50¢
Frank, Taylor's	dis 35¢ & 10¢
Frank, Brock's	dis 50¢ & 10¢
Frank, Cone's	dis 10¢
Frank, Connel's	dis 30¢ & 10¢
Lever, Sargent's	dis 60¢ & 10¢
Lever, Taylor's Bronzed or Plated	dis 60¢ & 10¢
Lever, Taylor's Japanned	dis 60¢ & 10¢
Lever, E. E. W. Co's	dis 60¢ & 10¢
Pull, Brock's	dis 60¢ & 10¢
Pull, Western	dis 60¢ & 10¢

Common Wrought	dis 60¢ & 10¢
Western	dis 60¢ & 10¢
Western, Sargent's list	dis 70¢ & 10¢
Kentucky "Star"	dis 60¢ & 10¢
Kentucky Sargent's list	dis 70¢ & 10¢
Dodge, Genuine Kentucky, New list	dis 70¢ & 10¢
Texas Star	dis 60¢ & 10¢ & 50¢ & 10¢ & 25¢

Call	
Farm Bells	\$ 2.25 @ \$3.50
Steel Alloy Church and School Bells	dis 40¢
Hellows—Blacksmiths	dis 60¢ & 10¢ & 60¢
Molders	dis 40¢ & 10¢
Pull, Western	dis 40¢ & 10¢

Selling, Rubber	
Common Standard	dis 7¢ & 10¢
Standard	dis 70¢ & 70¢ & 25¢
Extra	dis 60¢ & 25¢ @ 60¢ & 10¢
N. Y. R. & P. Co., Standard	dis 60¢
N. Y. R. & P. Co., Extra Standard	dis 50¢ & 10¢

Beach Steps	
Standard	\$ doz \$2—dis 50¢
Hutchins	\$ doz \$5.00—dis 10¢ & 10¢
Weston's, per doz No. 1, \$10; No. 2, \$9	dis 25¢ & 10¢ & 25¢
McGill's	\$ doz \$5—dis 10¢ & 10¢

Bits—Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.	
Bit Holders	
Sargent's	\$ doz \$15.00—dis 40¢ & 10¢
Extension, Ives	\$ doz \$30.00—dis 60¢ & 10¢
Diagonal	\$ doz \$24.00—dis 40¢
Angular	\$ doz \$24.00—dis 40¢ & 25¢
Blind Adjusters	
Domestic	\$ per doz \$3.00—dis 25¢
Excelsior	\$ doz \$10.00—dis 50¢ & 10¢ & 25¢
Washburn's Self-Loading	dis 30¢ & 20¢ & 10¢

Blind Fasteners	
Mackrell's	\$ doz pairs, \$1.00—dis 30¢ & 20¢ & 10¢
Van Sand's Screw Pattern	dis 15¢ \$ gro—dis 60¢ & 10¢
Van Sand's Old Pattern	dis 15¢ \$ gro—dis 65¢ & 10¢
Washburn's Old Pattern	\$ 2 \$ gro, net
Merriman's	\$ 2 \$ gro, net
Austin & Eddy No. 3006	\$ 2 \$ gro, net
Security Gravity	\$ 2 \$ gro, net

Blind Staples	
Barbed, 1/4 in. and larger	\$ 2 7¼¢ @ 5¢ net
Barbed, 1/4 in.	\$ 2 8¼¢ @ 5¢ net

Blocks	
Cleveland Block Co., Mal. Iron	dis 50¢
Novelty Tackle Blocks, Mal. Iron	dis 50¢

Doors and Shutters	
Cast Iron Barrel, Square, &c.	dis 70¢ & 70¢ & 10¢
Cast Iron Shutter Bolts	dis 70¢ & 70¢ & 10¢
Cast Iron Chain (Sargent's list)	dis 65¢ & 10¢
Ives' Patent Door Bolts	dis 60¢
Wrought Barrel	dis 70¢ & 70¢ & 10¢
Wrought Square	dis 70¢ & 70¢ & 10¢
Wrt Shutter, all Iron, Stanley's list	dis 60¢ & 10¢
Wrt Shutter, Brass Knob, Stanley's	dis 60¢ & 10¢
Wrought Shutter, Sargent's list	dis 60¢ & 10¢
Wrought Sunk Flush, Sargent's list	dis 55¢ & 10¢
Wrought Sunk Flush, Stanley's list	dis 50¢ & 10¢
Wrought R. K. Fin. Com'n Stanley's list	dis 55¢ & 10¢

Carriage	
Com. list June 10, '84	dis 75¢ & 25¢ & 25¢
Genuine Eagle, list Oct. '84	dis 75¢ & 10¢
Phila. pattern, list Oct. '74	dis 75¢ & 10¢ & 75¢ & 10¢ & 25¢
C. B. & W. old list	dis 70¢

Common, list Feb. 23, 1883	dis 70¢
P. C. B. & N. Co., Empire, list Feb. 23, 1883	dis 70¢
P. C. B. & N. Co., Philadel. list Oct. '84	dis 35¢
P. C. B. & N. Co., Keystone, Phil. list Oct. '84	dis 30¢
P. C. B. & N. Co., Norway, Phil. list Oct. '84	dis 75¢ & 10¢
Am. S. Co., Norway, Phil. list Oct. '84	dis 75¢ & 10¢
Am. S. Co., Eagle, Phil. list Oct. '84	dis 30¢
Am. S. Co., Philadel. list Oct. '84	dis 35¢
Am. S. Co., Bay State, list Feb. 23, '83	dis 70¢
R. B. & W., Philadel. list Oct. 13, 1884	dis 82¢
R. & E. Mfg. Co.	dis 70¢

Stoves and Pumps	
Stove	dis 60¢ & 25¢
Flow	dis 60¢ & 25¢
Am. S. Co. Stove, Ann-aled	dis 60¢ & 25¢
R. B. & W. Flow	dis 60¢
R. B. & W. Stove	dis 60¢ & 25¢
R. & E. Mfg. Co. Stove	dis 60¢ & 25¢
Machine, according to size	dis 75¢ & 10¢ @ 30¢
Bolt Ends, according to size	dis 75¢ & 10¢ @ 30¢
Servar	\$ 2 7¼¢ @ 10¢ & 40¢

Sewing Machines	
Without Augers. Upright. Angular.	
Douglas	\$5.50 30.75 dis 50¢
Small's, Rice's Patent	5.50 30.75 dis 40¢ & 10¢ & 25¢
Jennings	5.50 30.75 dis 45¢ & 10¢ & 25¢
Other Machines	2.25 2.75 dis 40¢ & 10¢
Phillips' Pat., with Augers 7.00	7.50 dis 40¢ & 10¢

Humason, Beckley & Co's	dis 60¢ & 10¢
Sargent & Co's	\$17 and 115, dis 60¢ & 10¢
Peck, Stow & W. Co	dis 50¢ & 10¢

Door Por. P. Nickel \$2.00 @ 1.25
Door Por. Plated, Nickel..... \$2.00 @ 2.25
Drawer, Porcelain dis 55¢-10¢-10¢ @ 10¢-10¢
Hemacite Door Knobs, new list..... dis 40¢-10¢-50¢
Yale & Towne Wood Knobs, list Dec., 1885..... dis 40¢
Furniture Plain..... 75¢ gross incd. dis 40¢
Furniture, Wood Screws..... dis 25¢-10¢
Base, Subl., Tip..... dis 70¢-10¢-25¢
Picture, Sargent's..... dis 60¢-10¢-70¢ @ 70¢
Picture, Hemacite..... dis 10¢-10¢ @ 70¢
Shutter, Porcelain..... dis 65¢-10¢
Carriage, Japanned..... * gross 30¢. dis 40¢-10¢

Ladies.
Melting Sargent's..... dis 55¢-10¢
Melting, Monroe, Patent..... * dis 35¢-10¢
Melting, P. S. & W..... * dis 35¢-10¢
Melting, Warner's..... * dis 30¢

Lawn Mowers.
Standard List..... dis 50¢-10¢
Enterprise..... dis 60¢-10¢

Enterprises.
Tubular, Lift Wire, with Guards..... * doz \$4.00 @ \$4.25
Tubular, Square Wire, with Guards..... * doz \$4.00 @ \$4.25
Tubular, Sq. Lift Wire, with Guards..... * doz \$4.00 @ \$4.25
Without Guards, 25¢ * dozen less.

Poles, Small, 30' 00'. Med. 37.25 Large, 39.75. dis 30¢-35¢
Lemon Squeezers.
Wood, No. 2..... * doz. \$3.00, dis 25¢-30¢
Wood, Common..... * doz. \$1.75, dis 30¢
Dunlap's Improved..... * doz. \$3.00, dis 30¢
Samms..... No. 1, 35¢; 2, 30¢; 12, 15¢ * doz. dis 25¢-10¢
Jennings "Star"..... * doz. \$2.50
The "Boss"..... * doz. \$2.50
Little Giant..... Nos. 1, * doz \$3.50; 2, \$2.50; 3, \$1.90
King..... dis 50¢ @ 50¢-25¢
dis 40¢-25¢

Lines.
Cotton and Linen Fish, Draper's..... dis 50¢
Draper's Chalk..... dis 50¢
Draper's Mason's Linen, 54 ft., No. 1, 1.25; No. 2, 1.25; No. 3, 1.25; No. 4, 1.25; No. 5, 1.25; No. 6, 1.25; No. 7, 1.25; No. 8, 1.25; No. 9, 1.25; No. 10, 1.25; No. 11, 1.25; No. 12, 1.25; No. 13, 1.25; No. 14, 1.25; No. 15, 1.25; No. 16, 1.25; No. 17, 1.25; No. 18, 1.25; No. 19, 1.25; No. 20, 1.25; No. 21, 1.25; No. 22, 1.25; No. 23, 1.25; No. 24, 1.25; No. 25, 1.25; No. 26, 1.25; No. 27, 1.25; No. 28, 1.25; No. 29, 1.25; No. 30, 1.25; No. 31, 1.25; No. 32, 1.25; No. 33, 1.25; No. 34, 1.25; No. 35, 1.25; No. 36, 1.25; No. 37, 1.25; No. 38, 1.25; No. 39, 1.25; No. 40, 1.25; No. 41, 1.25; No. 42, 1.25; No. 43, 1.25; No. 44, 1.25; No. 45, 1.25; No. 46, 1.25; No. 47, 1.25; No. 48, 1.25; No. 49, 1.25; No. 50, 1.25; No. 51, 1.25; No. 52, 1.25; No. 53, 1.25; No. 54, 1.25; No. 55, 1.25; No. 56, 1.25; No. 57, 1.25; No. 58, 1.25; No. 59, 1.25; No. 60, 1.25; No. 61, 1.25; No. 62, 1.25; No. 63, 1.25; No. 64, 1.25; No. 65, 1.25; No. 66, 1.25; No. 67, 1.25; No. 68, 1.25; No. 69, 1.25; No. 70, 1.25; No. 71, 1.25; No. 72, 1.25; No. 73, 1.25; No. 74, 1.25; No. 75, 1.25; No. 76, 1.25; No. 77, 1.25; No. 78, 1.25; No. 79, 1.25; No. 80, 1.25; No. 81, 1.25; No. 82, 1.25; No. 83, 1.25; No. 84, 1.25; No. 85, 1.25; No. 86, 1.25; No. 87, 1.25; No. 88, 1.25; No. 89, 1.25; No. 90, 1.25; No. 91, 1.25; No. 92, 1.25; No. 93, 1.25; No. 94, 1.25; No. 95, 1.25; No. 96, 1.25; No. 97, 1.25; No. 98, 1.25; No. 99, 1.25; No. 100, 1.25; No. 101, 1.25; No. 102, 1.25; No. 103, 1.25; No. 104, 1.25; No. 105, 1.25; No. 106, 1.25; No. 107, 1.25; No. 108, 1.25; No. 109, 1.25; No. 110, 1.25; No. 111, 1.25; No. 112, 1.25; No. 113, 1.25; No. 114, 1.25; No. 115, 1.25; No. 116, 1.25; No. 117, 1.25; No. 118, 1.25; No. 119, 1.25; No. 120, 1.25; No. 121, 1.25; No. 122, 1.25; No. 123, 1.25; No. 124, 1.25; No. 125, 1.25; No. 126, 1.25; No. 127, 1.25; No. 128, 1.25; No. 129, 1.25; No. 130, 1.25; No. 131, 1.25; No. 132, 1.25; No. 133, 1.25; No. 134, 1.25; No. 135, 1.25; No. 136, 1.25; No. 137, 1.25; No. 138, 1.25; No. 139, 1.25; No. 140, 1.25; No. 141, 1.25; No. 142, 1.25; No. 143, 1.25; No. 144, 1.25; No. 145, 1.25; No. 146, 1.25; No. 147, 1.25; No. 148, 1.25; No. 149, 1.25; No. 150, 1.25; No. 151, 1.25; No. 152, 1.25; No. 153, 1.25; No. 154, 1.25; No. 155, 1.25; No. 156, 1.25; No. 157, 1.25; No. 158, 1.25; No. 159, 1.25; No. 160, 1.25; No. 161, 1.25; No. 162, 1.25; No. 163, 1.25; No. 164, 1.25; No. 165, 1.25; No. 166, 1.25; No. 167, 1.25; No. 168, 1.25; No. 169, 1.25; No. 170, 1.25; No. 171, 1.25; No. 172, 1.25; No. 173, 1.25; No. 174, 1.25; No. 175, 1.25; No. 176, 1.25; No. 177, 1.25; No. 178, 1.25; No. 179, 1.25; No. 180, 1.25; No. 181, 1.25; No. 182, 1.25; No. 183, 1.25; No. 184, 1.25; No. 185, 1.25; No. 186, 1.25; No. 187, 1.25; No. 188, 1.25; No. 189, 1.25; No. 190, 1.25; No. 191, 1.25; No. 192, 1.25; No. 193, 1.25; No. 194, 1.25; No. 195, 1.25; No. 196, 1.25; No. 197, 1.25; No. 198, 1.25; No. 199, 1.25; No. 200, 1.25; No. 201, 1.25; No. 202, 1.25; No. 203, 1.25; No. 204, 1.25; No. 205, 1.25; No. 206, 1.25; No. 207, 1.25; No. 208, 1.25; No. 209, 1.25; No. 210, 1.25; No. 211, 1.25; No. 212, 1.25; No. 213, 1.25; No. 214, 1.25; No. 215, 1.25; No. 216, 1.25; No. 217, 1.25; No. 218, 1.25; No. 219, 1.25; No. 220, 1.25; No. 221, 1.25; No. 222, 1.25; No. 223, 1.25; No. 224, 1.25; No. 225, 1.25; No. 226, 1.25; No. 227, 1.25; No. 228, 1.25; No. 229, 1.25; No. 230, 1.25; No. 231, 1.25; No. 232, 1.25; No. 233, 1.25; No. 234, 1.25; No. 235, 1.25; No. 236, 1.25; No. 237, 1.25; No. 238, 1.25; No. 239, 1.25; No. 240, 1.25; No. 241, 1.25; No. 242, 1.25; No. 243, 1.25; No. 244, 1.25; No. 245, 1.25; No. 246, 1.25; No. 247, 1.25; No. 248, 1.25; No. 249, 1.25; No. 250, 1.25; No. 251, 1.25; No. 252, 1.25; No. 253, 1.25; No. 254, 1.25; No. 255, 1.25; No. 256, 1.25; No. 257, 1.25; No. 258, 1.25; No. 259, 1.25; No. 260, 1.25; No. 26

Silver Lake, C. Quality, White (only)..... 75c to 85c
 Sylvan Spring, Extra Braided, White..... 50c
 Sylvan Spring, Extra Braided, Drab..... 50c
 Semper Idem, Braided, White..... 50c
 Egyptian, India Hemp, Braided..... 50c
 Samson, Braided, White, Cotton..... 50c ds 30 & 30 1/2
 Samson, Braided, Drab Cotton..... 55c ds 30 & 30 1/2
 Samson, Braided Italian Hemp..... 55c ds 30 & 30 1/2
 Samson, Braided Linen..... 80c ds 30 & 30 1/2

Shank Locks.
 Clark's No. 1, \$10.00; No. 2, \$8.00 \forall gross..... ds 10 1/2
 Ferguson's..... ds 10 1/2
 Morris and Triumph, list Aug. 16, 1886..... ds 10 1/2
 Victor..... 10 1/2
 Walkers..... ds 10 1/2
 Stewart Mfg. Co..... ds 10 & 30 1/2
 Bedding, list..... ds 10 1/2
 Hammond's Window Springs..... ds 20 & 30 1/2
 Common Sense, Jap d. Copp'd and Br'd..... \forall gross 14.00
 Common Sense, Nickel Plated..... \forall gross 14.00
 Universal..... ds 20
 Kempshall's Gravity..... ds 20
 Kempshall's Model..... ds 20
 Loring's, list Feb. 15, 1886..... ds 20
 Payson's Perfect..... ds 20 & 30 1/2
 Hugunin's New and Improved Adjustable Shank Balances, list Jan. 5, 1887..... ds 25 & 27
 Hugunin's New Shank Locks, list Jan. 5, '87, dis 25 & 27
 Soddard "Practical"..... ds 19
 Ives Patent..... ds 20
 Loring's, No. 10 & 11 \forall gro. \$8; 108, \$10, ds 20 & 10
 Davis, Iron, Barre Wfr. Co..... ds 20
 Champion Safety, list March 1, 1886..... ds 55 & 58 1/2
 Security..... ds 70

Shank Weights.
 Solid Eyes..... \forall ton 22

Massage Stuffers or Millers.
 Miles' "Challenge"..... \forall doz. \$20, ds 50 & 50 1/2
 Perry..... \forall doz. No. 1, \$15; No. 0, \$11, ds 50 & 50 1/2
 Draw Cut No. 4..... each, \$30.00, ds 20
 Enterprise Mfg. Co..... ds 20 & 25
 Security..... ds 25

Saws.
 Diston's Circular..... ds 45 & 45 1/2 \forall Extras some
 Diston's Cross Cut, ds 45 & 45 1/2 \forall times given by
 Diston's Hand..... ds 25 & 25 1/2 \forall jobbers.
 Atkins' Circular..... ds 50
 Atkins' Silver Steel Diamond X Cuts..... \forall foot 70
 Atkins' Special Steel Dexter X Cuts..... \forall foot 50
 Atkins' Special Steel Diamond X Cuts..... \forall foot 30
 Atkins' Champion and Electric Tooth X Cuts..... ds 27
 Atkins' Hollow Back X Cuts..... \forall foot 15
 Atkins' Shingle, Mulay, Drag, &c..... ds 45
 W. M. & C., Hand..... ds 20 & 30 1/2
 W. M. & C. Champion X Cuts, Regular \forall foot 24
 W. M. & C. X Cuts, Train Back..... \forall foot 27
 Peace and Sun..... ds 20
 Peace Hand Panel and Rip..... ds 20 & 10
 Peace Cross Cuts, Standard..... \forall foot 25
 Peace Cross Cuts, Thin Back..... \forall foot 27
 Richardson's Circular and Mill..... ds 45 & 45 1/2
 Richardson's X-Cuts, No. 1, 300; No. 2, 27; No. 3, 24

Saw Saws.
 Griffin's Hack Saw, complete..... ds 40 & 10
 Griffin's Hack Saw, Blades only..... ds 40 & 10
 Star Hack Saws and Blades..... ds 25
 Diamond Hack Saws and Blades..... ds 25
 Eureka and Crescent..... ds 25

Saw Frames.
 White Vermont..... \forall gro 20 & 25
 Red, Polished, and Varished..... \forall doz \$1.50, ds 25

Saw Sets.
 Stillman's Genuine..... \forall doz \$5.00 and \$7.75, ds 40 & 25
 Stillman's Imita..... \forall doz \$3.50 and \$5.00, ds 25
 Morrill's No. 1, \$15.00; Nos. 2 & 4, \$8..... ds 40 & 25
 Leach's..... No. 0, \$5.00; No. 1, \$15.00, ds 15 & 20
 Nash's..... ds 20 & 10
 Hammer, Hothkiss..... \$5.50, ds 10
 Hammer, Botsch & Call Co.'s new Patent..... ds 30 & 25
 Bennis & Call Co.'s Lever and Spring Hammer, ds 10
 Bennis & Call Co.'s Cross Cut..... ds 15
 Aiken's Genuine..... \$15.00, ds 40 & 15
 Aiken's Imitation..... \$7.00, ds 30 & 25
 Hart's Patent Lever..... ds 20
 Diston's, Star, 30, No. 15, \$5.50, ds 20 & 10
 Atkins' Lever..... per doz No. 1, \$5.00; No. 2, \$3.50
 Crockett's Superior..... \$1.00, ds 20
 Avery's Saw Set and Punch..... ds 25 & 25

Saw Tools.
 Atkins Perfection..... \$15.00; Excelsior \$5.00 \forall doz
 Bennis.

Scales.
 Hatch, Counter, No. 171, good quality..... \forall doz \$11
 Hatch, Tea, No. 151..... \forall doz \$7.50 & 7.00
 Union Platform, Plain..... \$2.10 & 2.00
 Union Platform, Striped..... \$2.30 & 2.20
 Chatillon's Grocers' Trip Scales..... ds 50
 Chatillon's Eureka..... ds 25
 Chatillon's Favorite..... ds 40
 Family Turnball..... ds 30 & 25
 Richle Bros' Platform..... ds 5

Scales Beam.
 Stearns' No. 1, of Jan. 12, 22, ds 50 & 10
 Chatillon's No. 1..... ds 40
 Chatillon's No. 2..... ds 50

Scrapers.
 Adjustable Box Scraper (B. R. & L. Co.) 195.50, ds 20 & 15
 Box, 1 Handle..... \forall doz \$4.00, ds 10
 Box, 2 Handle..... \forall doz \$5.00, ds 10
 Exchange Box and Ship..... ds 20 & 15
 Foot..... ds 20 & 15
 Ship, Common..... \forall doz \$3.50 and 3.00
 Ship, Providence Tool Co..... ds 10

Screen Window and Door Frames.
 Porter's Pat. Window and Door Frames..... ds 25 & 10
 Screen Corner Irons, Warner's..... ds 35 & 25
 Stearns' Friction, No. 1 Forged Blade..... ds 25 & 25

Screw Drivers.
 Douglas Mfg Co..... ds 20 & 10
 Diston's..... ds 20 & 10
 Diston's Patent Excelsior..... ds 20 & 10
 Book Bros..... ds 20
 Stanley R. & L. Co.'s Varished Handles..... ds 20
 Stanley R. & L. Co.'s Black Handles..... ds 20
 Sergeant & Co.'s 1 Forged Blade..... ds 20 & 10
 Sergeant & Co.'s Nos. 30, 40 and 60..... ds 20 & 10
 Knapp & Cowles' No. 1..... ds 20 & 10
 Knapp & Cowles' No. 1 Extra..... ds 20 & 10
 Knapp & Cowles' No. 00 & 1..... ds 20 & 10
 Stearns'..... ds 25 & 10
 Gay & Parsons..... ds 20 & 10
 Cassin's..... ds 20
 Olcott's Patent..... ds 20 & 10
 Crawford's Adjustable..... ds 20
 Ellrich's Socket and Ratchet..... ds 25 & 10
 Allard's Spiral, new list..... ds 25
 Kolb's Common Screw..... \forall doz \$5, ds 20 & 10
 Syracuse Screw Drive \forall Bits..... ds 50 & 25
 Screw Driver Bits, F. B. R. & Co..... ds 25
 Fray's Hol. Drive, Sets, No. 2, \$12..... ds 25 & 25
 P. D. & Co.'s, all Steel..... ds 50

Screws.
 Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887
 Flat Head Iron..... ds 70
 Round Head Iron..... ds 65
 Round Head Brass..... ds 65
 Round Head Brass..... ds 60
 Flat Head Bronze..... ds 65
 Round Head Bronze..... ds 60

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THE IRON AGE

THURSDAY, DECEMBER 13, 1888.

Improved Drainage Pump.

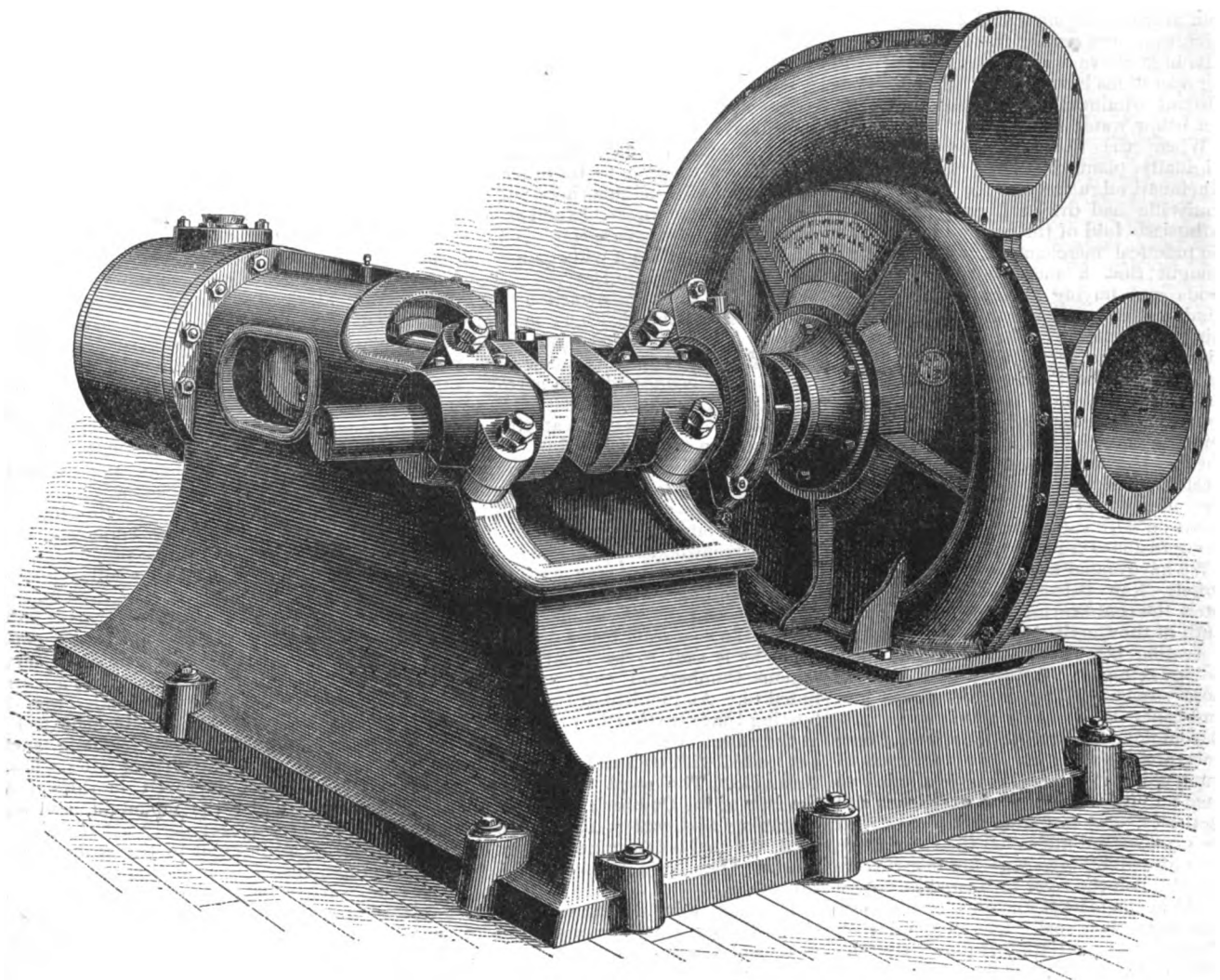
We show on this page one of a line of improved pumps for drainage, dredging and other similar purposes, built by the Morris Machine Works, of Baldwinsville, N. Y. It is known as their No. 12 direct connection pump for irrigation and drainage, and was originally intended to be used as a bilge pump for use on vessels. Having a capacity of 10,000 gallons per minute it was thought that it would serve a valuable purpose in case of collision. A hori-

pressure in its seat. The union would seem to make a tight joint with comparatively light pressure.

A New 38-Inch Lathe.

Lodge, Davis & Co., of Cincinnati, Ohio, are building a new 38-inch lathe which embraces several novel features. Among these is the depth of bed, with liberal amount of metal in the upper and lower portions especially, and having the two sides tied together by diagonal braces

either direction. There is also automatic cross feed, these two feeds being so arranged that one cannot interfere with the other. The feed rod may be driven by gearing when desired, so that feeds can be obtained, ranging from 100 per inch to 5 per inch, in either carriage or cross feeds. No worm gear is used in the carriage apron. The feed rack is cut of steel. A stop is provided for automatically disengaging the feed at any predetermined point. The lead screw, as in all lathes built by this firm, is inside of the



DRAINAGE PUMP, BUILT BY THE MORRIS MACHINE WORKS, BALDWINVILLE, N. Y.

zontal engine is used for driving. It has a 17-inch cylinder, with 10-inch stroke, and can be safely run at a high speed. The whole outfit is compact and substantial.

Metallic Wire-Packed Unions.—Mr. John A. Prindle, of the Worswick Mfg. Company, Cleveland, Ohio, has brought out a novel and effective wire-packed union for pipes, &c. The essential feature of the device consists in a recess in the union with its interior wall perpendicular and its exterior wall inclined and a metallic wire packing with open ends, conforming in size and shape to this recess. The wire is preferably brass spring wire, and is bent into circular form. The ends of the wire are dressed accurately, so as to abut fairly, the wire being of such length that the ends meet when it is laid without

crossing each other, the object being to secure rigidity in resisting torsional as well as other strains. The head stock has a bearing upon, and is bolted securely to, the bed throughout its length instead of at the ends only, and the inside web is carried up as near as possible to the back bearing, which has to resist the thrust. The spindles are of steel, the main bearing being $5\frac{1}{4} \times 9$ inches and the back bearing being $5 \times 7\frac{1}{4}$ inches. The tail stock also has a bearing on the bed along its entire length, and is clamped by four bolts. For convenience in handling it is provided with a crank handle, by means of which, in connection with a pinion, the feed rack is employed for moving it. In addition to the inherent stiffness of the saddle the apron is secured to it in such a manner as to still further stiffen it. The compound rest has automatic feed at any angle in

bed immediately under the inside V and nearest the point of resistance. The nut is in two parts, which close upon it in the usual manner, working in a box, which forms a support for the screw as well. The screw is of steel, and geared to cut from 12 threads per inch to one thread in 2 inches. The nut, as well as all manipulations of the feed, including the reversal, is operated from the front of the carriage, special attention having been paid to ease and convenience of handling. A steady rest accompanies the lathe. It has four jaws, and is proportioned in keeping with the general design of the lathe. The countershaft has tight and loose pulleys, 24 inches in diameter for a 4-inch belt.

The lathes are made with various lengths of beds, advancing by 2 feet up to 24. The weight with a 12-foot bed is 12,000 pounds.

Collieries Between the Cumberland River and the Tennessee Valley.

The Cincinnati, New Orleans and Texas Pacific Railway passes over and alongside greater areas of coal and iron-ore bearing land than any railroad in the United States. Coming from Cincinnati it enters the great Cumberland coal field, a mile south of the Cumberland River, thence for 91 miles its track is entirely upon coal-bearing strata, and thence for 72 miles further south its track is never over a mile from coal-bearing strata, and a less distance from the well-known persistent vein of red fossil iron ore. Then passing Chattanooga and Wauhatchie for 198 miles, one side or the other, and frequently on both, are within 1 to 2 miles of veins of iron ore and coal. From Emory Gap to Dayton, 41 miles, is an unbroken vein of iron, ranging from 3 to 5 feet in thickness, and while it exists in many hills high above water level, actual mining operations have proven that it exists without diminution in quality over 225 feet below water level.

When the Cincinnati Southern was originally planned it was thought that Cincinnati might regain the trade which Louisville had drawn from her. A few enthusiasts told of the coal and iron, but the practical merchants of the Queen City thought that a mere nothing. Selling goods and buying produce was in their minds and eyes, yet it is probable that one-third of the traffic of the road is on these minerals. The facts which have been stated as to the Cincinnati-Southern Division are also true of the Alabama Great Southern Division, the coal, however, being nowhere in such close proximity to the ore, but the amount of ore is much greater. The vein of ore is continuous for very nearly 198 miles, and is at some points on both sides of the line, and is for a long distance from 20 to 25 feet thick.

We have stated that the line of the Cincinnati, New Orleans and Texas Pacific enters the coal-bearing strata about a mile south of the Cumberland River. The coal in section belongs to what is known in geology as the sub-conglomerate coals, being those seams existing in the shales and sandstones, between the lowest and greatest conglomerate and the limestone. These coals are wanting in many sections of country, but in the region now alluded to reach an unusual degree of excellence and regularity. The coal from what was called the Cumberland mines, on the river above the railroad bridge, was for many years boated down the river to Nashville, where it sold in the market for considerably more than any other coal. The first mine on this railroad is at Happy Hollow; the elevation of the track there is 998 feet above sea level, and the coal seam is 100 feet higher. The first well-defined show of the conglomerate is at Flat Rock, ten miles south of Happy Hollow. The track is there immediately upon it, and its elevation above the sea is 1300 feet. There is a general dip of all the strata and of course of the coal seams to the southeast. The elevation of track at Greenwood, three miles south from Happy Hollow, is 1200 feet, the Greenwood seam is a little higher, but the Beaver Creek mines are much lower. The natural inference from these data would be that the coal of all these mines, Happy Hollow, Greenwood, Beaver Creek and Barren Fork, are all below the great conglomerate which shows so plainly and so massively at Flat Rock.

As there has never been any thorough survey of the Tennessee coal field the exact dip of the strata to the southeast is not known, but it disappears forever among the horizontal strata after its well-defined appearance at Flat Rock, but is to be found in the vertical pitched-up strata of Walden's ridge. The disappearance of

this great geological age-mark demonstrates the fact that all coals to the southeast belong to the series above it and may be more certainly depended upon for permanence in area and regularity in thickness. As already stated, the first mining operation on the line of this railway coming from the north is that of the Cleveland Coal Company, at Happy Hollow. Compared with many others this mine is small, but there are none anywhere more elegantly located for handling coal quickly and cheaply. The track which goes to the coal-tipple is only 400 yards long, and the main entry is only about 150 feet from the top of the incline. The seam of coal ranges from 3½ to 4 feet in thickness. There are three entries into the mountain. The output is now about 150 tons per day. Fifty miners and 16 outside men of all kinds are employed. This mine is 172½ miles from Cincinnati. The chief market of their coal is Kentucky towns and cities. The capital invested amounts to \$50,000.

The next mine is Greenwood, 175½ miles from Cincinnati. This was one of the first mines on the road, having been opened in 1878, and it has been worked many years with varying fortune. The Greenwood seam of coal appears to be different from any other in the neighborhood; it is in an isolated series of knobs. In and around this mine about 440 men are employed. From Greenwood Station a wide gauge railroad runs down 6½ miles to Beaver Creek, where there is another mine owned by the same company. At this place 65 men are employed. Two miles east of Beaver the same company is opening a new mine, with which it is connected by a narrow gauge railroad. This coal and that at Beaver is much lower than the track at Greenwood, therefore the cars are lifted up to a tipple on an incline. Three steam engines are used in getting the coal from the mines to the main line at Greenwood. The total product is about 280 tons per day, of which Greenwood supplies about 180 tons. The entire output is taken by the railroad for its own use. The area of land owned by this company is 20,000 acres. The coal of the new seam being opened by this company is said to be identical with the famous Cumberland coal previously alluded to. An incident of the perils of old boating times is related by one of the men at the mine: On one tide 24 boats started out loaded with coal and only six reached Nashville. The great trouble lies with the falls of the Cumberland. A peculiarity in mining this coal is that no powder is used, the coal being prized out in cubical blocks. The seam will average 4 feet in thickness.

The next mine is Barren Fork. It is about 3 miles from the main line of the road, and is near Flat Rock Station. At this mine machines are used for mining. The output is about 10 cars per day, which is entirely sent to Kentucky markets. The Hellenwood Mine is 211 miles from Cincinnati in the State of Tennessee. It is the first of the mines that may be assumed to be above the great conglomerate. As the line of road comes into Tennessee, there is to be seen on the eastern side, rising to a very high elevation, a series of peaks and ranges, all of which contain coals above the conglomerate, and many rising high enough to contain some of the upper measure seams. This is especially true further south on the line, as in Morgan County only a few miles east rise the high mountains of the Crooked Fork country, which contain many valuable seams of coal. The Hellenwood has been opened for many years and worked with poor results. It is now leased by Mr. Fry. The cause of former trouble was a seam of bony coal in the middle, which was very hard to get rid of, but Mr. Fry writes that this has almost entirely gone out. The output is now about 60 tons per day. From 18 to 20 men are employed. This

mine is owned chiefly by parties in Chattanooga. The next mine is near Robbins Station, 218 miles from Cincinnati and 117 miles from Chattanooga. This operation is known as the Robbins Coal Mining Company. The same seam of coal is worked here as at Glenmary. The mine was opened July, 1887, and they have driven in a main entry 2300 feet. The seam ranges from 3 to 4 feet in thickness. The output averages 240 tons a day; 70 miners and 30 outside men are employed. The property is owned by persons in Chattanooga. It is their intention to erect ovens and manufacture coke. At Hoffman's Switch a small operation has been commenced, which will be of considerable importance when gotten into the hands of persons with capital sufficient to develop it. It is called the Ottburg Coal Company, and they have a lease on 1000 acres at the remarkably low price of \$100 per year.

The largest coal-mining operation on this division of the Cincinnati, New Orleans and Texas Pacific Railway is that of the Glenmary Coal and Coke Company. The mines of this company are located near Glenmary Station, 223 miles from Cincinnati and 112 miles from Chattanooga. The mines are 7300 feet from the main line, near the station-house. Of this distance 3500 feet is a standard gauge railroad to the coke ovens and tipple; thence a narrow gauge 3800 feet to the main entry. This mine was opened in 1880, and had a somewhat precarious existence for some years, but has been made a success under the excellent management of Col. John H. Clarke. The stockholders of the company reside principally in Kentucky, but some are in Chattanooga. Mr. Geo. W. Darnell, of Lexington, Ky., is president of the company, and Colonel Clarke is still superintendent. In 1881 there were shipped from this mine 45,000 tons, and 175 hands were employed, no coke being made. For the present year, 1888, the shipments of coal will average 400 tons per day, and of coke from 65 to 70 tons per day, while an average of 300 miners and 100 outside hands are employed. The length of the main entry, out of which the coal is brought, is but a poor indication of the system of underground railways inside, it being only 3300 feet, while one cross entry is 5000 feet long, and the total length of entries is 7½ miles. The seam of coal has improved in thickness the further under the mountain, and at 3000 feet is very regularly 4 feet thick. The coal is all brought to this main entry by mules, thence it is pulled out by wire rope. When "a trip" of 50 to 60 cars is made up, the little locomotive on the narrow gauge hauls them down to the tipple. In this handling so large a quantity at a time is one secret of the profitable operation of the mine.

This coal is very highly esteemed, and sells readily everywhere from Lexington, Ky., to Macon, Ga. The coke made is probably the best south of Virginia. Large quantities have been sent to Colorado and Arizona. It is made entirely from unwashed slack, and its analysis shows: Carbon, 91.00; ash, 9.00, and sulphur, 0.480. The company have not gone into the wild craze, too common in the South, of owning a large acreage not available for many years, but own only 3000 acres, a very large proportion of which carries the seam they are now working.

This is the last mining operation immediately on the road line until the railway passes into the Tennessee Valley.

It is estimated that nearly 40,000 square miles of the State of Colorado are underlain with coal, embracing every variety, from the soft, clean and beautiful lignites to the highly bituminous, semi bituminous and all grades of anthracite.

New Stationary Blast Forge.

The accompanying cut illustrates a new stationary blacksmith's forge, which was especially designed and built by the Buffalo Forge Company, of Buffalo, N. Y., for the Burton Car Company, Wichita, Kan., to meet their requirements for extra heavy work. It has a large deep fire-pan, 62 x 48 inches by 10 inches deep, with fire-pit 4 inches lower still, giving a depth of 14 inches from top of bowl to bottom of fire-pit, thus making it especially adaptable to handling large and heavy work. For light work the gates on side can be opened and fire lowered 4 inches.

The tuyere iron is extra heavy with a 3½-inch blast gate, fitted with an improved anti-clinker triangular ball for regulating the blast, and is designed especially to withstand heavy service without burning out. The water and coal boxes are cast in one piece with the fire pan, with a sloping partition dividing the two for easy removal of coal. Although the patterns for these forges have been completed only a short time, we understand that they have

Engineers and others, who have taken special interest in the work, and who know that a wind pressure of 56 pounds per square foot has been allowed for over the whole structure, would not expect any other result; but to the uninitiated the gale should certainly be reassuring. It is greatly owing to the necessity of providing for a large wind pressure that the bridge presents such a massive appearance, for the surface exposed to wind action is so large that there is a pressure of 8000 tons allowed for between the two cantilever end piers, due to wind alone; the stresses on the steel, however, from this and all other causes do not exceed one-fifth of the amount that would actually cause any part to fail.

The method of recording the force of the wind at the works is very complete. On the Island of Inchgarvie are placed three wind gauges or pressure boards, the larger one, 300 square feet in area, is fixed square to the east and west winds, and of the two smaller ones of 1½ square feet area, one is fixed as above, and the other is free to swivel square to the wind in any direc-

date of sales. The term 'regularly authorized agents,' used in the letter, was intended to apply only to agents who are practically officers of the furnace companies, and not to commission merchants, who are, I suppose, in a certain sense agents for all the furnaces. To avoid duplicate reports or misunderstandings of any kind, it is desired that sales made by commission merchants shall be reported through the furnace companies for whom they are made."

Rope Driving.

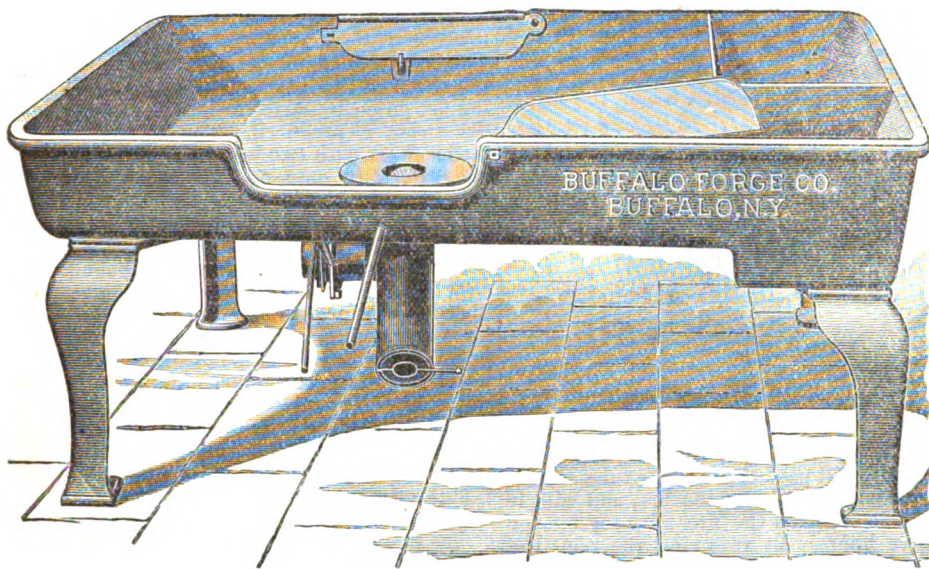
There are three types of grooves used in various works—one is the U-shaped groove for binder pulleys only, where the rope rests in the bottom of a semicircle large enough to hold it; another is the V-shaped groove, and a third is where the groove is approximately in the shape of an ellipse, the radius of the bottom groove being about 60 per cent. of the radius of the rope. The speed of such ropes is limited to about 5000 feet per minute, at which velocity the centrifugal force becomes a very important element in the capacity of the system for the transmission of power. The working stress of the ropes varies very widely in practice. As high as 500 or 600 pounds have been applied on a 2-inch rope, although the best practice limits the stress upon such a rope to about one-half of that amount. The following figures give the result of what has been shown to be good practice:

Diameter of ropes. Inches.	Working stress on one rope. Pounds.	Diameter of ropes. Inches.	Working stress on one rope. Pounds.
1½	247½	2 1-16	256
1 11-16	220	2 1-16	330
1¾	278½	2 1-16	349
1¾	330	2½	205
1¾	363	2½	330

The advantages claimed for rope driving are the absence of slip, the ability to turn the corners and to run to any desired distance; the cheapness of cost, it being about two-thirds that of leather, and also economy of maintenance. On the other hand, it is claimed that the mechanical efficiency of rope driving is not so high as by belt driving, that the power required to press the rope into the grooves, and then to pull it out as it leaves the pulley, is a large element in the problem, and also that the ropes are subject to a greater degree of wear than is estimated by their advocates. There is also a difference by reason of the fiber used, and ropes made of manila will not give results equal to those of cotton, unless the manila has been laid and treated especially for the purpose.

The contract for the ironwork of the reconstructed Chamber of Commerce building, on the corner of La Salle and Washington streets, Chicago, has been awarded to Vierling, McDowell & Co., of the same city. They have sublet the contract for the beams, girders and other wrought work to Jones & Laughlins. Steel alone will be used, and from 1200 to 1500 tons will be required. The original building has been remodeled to contain five stories, and a new superstructure of eight stories and an attic will be added. The whole building will then consist of thirteen stories, a basement and an attic, and will be one of the tallest buildings in Chicago, or probably the tallest. The alterations are to be completed by the 1st of August next. The building will be exclusively used for offices. Baumann & Huehl are the architects. The Chamber of Commerce Vault Company are the owners.

The connecting-rod of the new Puritan is a forging 40 feet long and weighing, finished, 21 tons.



NEW STATIONARY BLAST FORGE, BUILT BY THE BUFFALO FORGE COMPANY, BUFFALO, N. Y.

already been supplied to the American Brake Company, St. Louis, Mo.; Binghamton Wagon Company, Binghamton, N. Y.; Mexican National Railroad Company, and others, thus indicating their advantages for wide range from light to heavy work.

Wind Pressures on the Forth Bridge.

Mr. I. E. Tuit, of the Forth Bridge Works, writes as follows in the *Scotsman* with reference to the effect of the recent gales in Scotland on the Forth Bridge:

That the high winds that have prevailed for the last few days could in any instance have been serviceable is not easy to believe, yet they should be the means of inspiring confidence in a great number of minds when it is known that the Forth Bridge has withstood their power without sustaining the least damage. Of course some part of the timber stagings used for the purposes of erection, and also small wooden houses built for shelters for the men, which were situated on exposed parts of the structure, have been damaged; but the steelwork of the bridge itself has not suffered at all, and although about 100 cranes are distributed over the work, not one has sustained any injury. The total damage, indeed, can be made good with two loads of boards.

There are, in addition to these, some half-dozen others distributed over the works. The greatest pressure recorded during the present gale was on Friday, the 16th inst., when it was 27 pounds per square foot on the large board of 300 square feet area; 41 pounds on the small fixed; and 35 pounds on the movable boards. The wind, being southwest, did not strike the fixed board at right angles. At the other parts of the bridge an average pressure of 32 pounds per square foot was recorded. It will therefore be seen that the greatest pressure during the present gale, as recorded by the largest pressure board at the bridge, was not quite half that which has been allowed for in proportioning the various members of the Forth Bridge.

T. H. Carter, Commissioner of the Southern Railway and Steamship Association, has issued the following circular: "I am advised by a number of the furnace companies that it will be impracticable to report sales of pig iron within three days from date thereof, and there is a general expression of opinion from furnaces thus far heard from that the time within which sales may be reported should be extended to ten days, instead of three days, from date of sales. My letter of the 17th inst. is, therefore, modified so far as to allow, when necessary, as much as ten days from

Copper for Electrical Purposes.

Referring to the Elmore process of turning out electrically deposited copper pipes, *Engineering* says:

The advantage to be derived by obtaining the best copper was perceived in the early days of submarine cable enterprise, and over 20 years ago Dr. Matthiessen carried out a series of careful and valuable experiments in order to fix a standard to which the various samples of commercial copper could be referred. By using elaborate precautions he obtained the purest copper that was then practicable, and determined that a pure hard-drawn copper wire 1 m. in length and 1 gram in weight should have a resistance of 0.1469 ohm at the temperature of 0° C. This standard has been in use up to the present and has been believed for many years to be the extreme limit of conducting power for copper. But, owing to the great care that has since been bestowed by copper manufacturers, this standard has occasionally been surpassed, and by the introduction of the improved method under consideration has been rendered obsolete. Some of the early cables possessed a very low conductivity, but year by year steady improvement has been shown, until at the present date copper having a lower conducting power than 96 or 98 is rarely accepted.

In order to obtain the best quality of copper for cable and other electrical purposes the practice of late years has been to get electro-deposited copper in the usual manner, and then to exercise the greatest possible care in melting it for casting into "wire bars," which are then drawn into wire. A very small amount of an impurity, such as arsenic, antimony, sulphur, phosphorus, &c., gaining access to the metal at once greatly reduces the conductivity. At Birmingham, Swansea and other places dynamo machines and tanks are at work depositing scores of tons of copper weekly, but the metal produced, although pure, is of the usual granular or crystalline texture of electro-deposited copper, and possesses very little tensile strength and cohesiveness. Therefore, as above stated, it is necessary to melt it into "wire bars," and even if the greatest care is exercised the metal must deteriorate in the process.

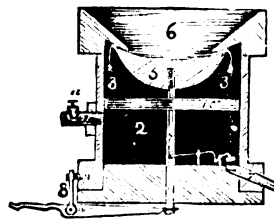
The new method has the important advantage that impurities have no opportunity of gaining access to the metal. By the nature of the process it is necessarily and unavoidably pure. Special machinery has been arranged so that an electro-burnished tube of any desired length, diameter and thickness can be cut spirally into a square wire, which can then be drawn down in the usual manner to any required diameter. The wire being drawn directly from the electro-burnished tube obviates entirely the necessity for melting, and thus constitutes altogether a new departure in the manufacture of pure copper wire. Some of the tests to which it has been subjected are very interesting. Two large coils of the new wire were taken, the wire of the first having a diameter of 0.113 inch (about 12 B. W. G.), and the second a diameter of 0.05 inch (about 18 B. W. G.), both being extremely hard-drawn. In order, however, to be perfectly satisfied that the practical limit of hardness had been reached, the larger wire was drawn through 13 holes in a draw-plate (the last hole being of agate) without annealing, until the diameter of the wire was reduced to 0.057 inch. Its hardness may be judged of by the fact that the breaking strain was 29 tons per square inch with an elongation of only $\frac{1}{4}$ per cent. The No. 18 B. W. G. wire had a breaking strain of nearly 29 tons per square inch, with an elongation of only $\frac{1}{4}$ per cent. When these wires were annealed they showed an elongation of 25 to 33 per cent. before breaking.

The hard wire is admirably adapted for overhead telegraph wires, possessing the

two requisites of great strength and high conductivity. The efficiency of dynamo machines and electrical instruments can be increased because a greater number of "ampère turns" can be got within a given space. The copper tape or ribbon used so extensively for lightning conductors can be cut direct from the tube of any length and sectional area by the special machinery before mentioned.

Lister's Tuyere Iron.

Messrs. Peter Lamp & Co., of Davenport, Iowa, have just brought out an improved form of tuyere iron, of which we annex a cut. This clearly explains the construction adopted. No. 2 is the air chamber; 1, the tube where the blast is forced in from the bellows; 3, the air passage where the arrows are marked, and through which the air is forced up into the basin; 6 shows where the fire is placed; 5 is the cup which is placed under the basin, and is held in place by a rod, 4, crossbar 10 and runs down through the bottom of chamber 2, and is raised and lowered by lever 9. The latter is held in place by post 8; 7 is a tube put in close at the bottom of the chamber, so as to blow out any particles of dust or melted iron that might overflow the cup. This tube is stopped up with a plug when the fire is being used. When the fire is



Lister's Tuyere Iron.

not in use the plug is removed, and draft enough will pass through the tube and up the chamber and into the fire, and will, it is claimed, keep the fire alive for two or three hours. By removing the plug the fire is always ready for use. No. 11 is a check-valve placed close to the nozzle of the bellows, so that the cup 5 can be set in a fixed position, and the blast can be regulated by the check-valve to suit the kind of work. The flange around the basin is left with a flat surface, so that a wrought-iron band can be shrunk on to prevent the casting from cracking with the heat, making the whole tuyere iron more lasting and durable.

The device is made in five sizes, the smallest for use by common horseshoers, and the largest in railroad shops, &c. It is in use at the United States Arsenal, Rock Island, Ill.

There were up to last June three blast furnaces in operation in all Canada. Within a year from now there will be ten working full time. Two of them will be situated in Montreal, and the other five scattered, principally through western Canada. The *Pittsburgh Times* says, the places where they will be located are so far kept quiet, as the contracts are not yet definitely concluded. The principal firms so far interested are J. P. Witherow and the Swindell Construction Company.

The Pratt & Whitney Company have lately put on the market a most ingeniously designed automatic grain scale, which will be found a very convenient machine for warehouses, mills, elevators and other places where means of weighing grain quickly and accurately are needed. A large bucket hanging in a frame receives the grain, and when a certain weight is in

the stream is automatically shut off and the load dumps the bucket. No springs of any kind are used in the machine, the movements being operated by gravity alone.

The Temple Water Tube Boiler.

A recent issue of *Industries* contains illustrations of a type of water tube boiler which, although introduced in France more than two years ago, is but little known in this country. It is the invention of M. Felix du Temple, a French naval officer, who devised it with the primary object of replacing the boilers of the locomotive type generally used on torpedo boats. The boiler was first tried on the torpedo boat No. 20 in the French navy, and appears to have given complete satisfaction, inasmuch as 27 trial runs were made with this boat without necessitating repairs of any kind to the boiler; and in view of this performance, the French Government have ordered a 500 horse-power boiler of the same type, for their torpedo boat No. 54. The heating surface consists of a large number of drawn steel tubes 0.4 inch in external diameter, and bent into a zig-zag form, with their upper ends connected to a steam collector, and their lower ends to a rectangular water tube. The latter is outside of the furnace; but the steam collector is heated by the escaping fire gases, by which means thoroughly dry steam is produced. The boilers are made either with two water tubes or with one water tube only, and are accordingly classed as double or single boilers. The furnace of the boiler is protected by a fire-brick setting contained in an iron casing, which is carried up and forms the boundary of the flues. The feed water is introduced at the forward end of the rectangular water tubes. These tubes are also joined by a breeches pipe in front with the lower part of the steam collector. As the water in the small tubes is evaporated, and ascends in the form of steam into the collector, its place is taken by water flowing down the breeches pipe into the horizontal water tubes, and thus a very efficient circulation is kept up. The inventor claims that by making the zig-zag tubes very small in diameter the danger of any of these tubes exploding is greatly minimized, while the rapid circulation due to the small diameter prevents the accumulation of sediment. The deposition of sediment is limited to the collector and rectangular water tubes, and can be removed by the blow-off cock shown at the back of the boiler. The zig-zag shape of the small tubes provides for their expansion and contraction, without putting any sensible strain on the other parts of the boiler. Owing to the small quantity of water contained in the boiler, steam can be raised very quickly. The inventor claims that a 500 horse-power boiler can be put under pressure in three-quarters of an hour, and that its total weight does not exceed 5½ tons, or about 25 pounds per horse-power.

In relation to the reported delay in the work upon the battle-ship *Texas*, Secretary Whitney says the plans of that ship are not wrong in any respect. After Mr. Bryce-Douglas, the great engineer who designed the engines of the *Etruria*, went to the Barrow Shipbuilding Company as designing engineer, he began to overhaul the designs of the *Texas*, and asked for more displacement. The Department deemed it wise to add to her length from 10 feet to 15 feet for the sake of getting more speed. With the 10 feet additional length the *Texas* will be only up to the displacement of the *Maine*, her sister ship. The delay in her construction, Secretary Whitney says, is rendered necessary by the fact that the new tools and machinery have been delayed in delivery.

The Deane Duplex Pump.

We illustrate on this page a duplex steam pump, as built by the Deane Steam Pump Company, Holyoke, Mass. It is designed for fire service or other uses where a heavy and uniform pressure is required. Prominent features in this design are strength, compactness of arrangement and convenience of access to the working parts. When used upon sprinkler systems an automatic device can be obtained with the pump for controlling its action. The internal arrangement of these pumps

40-ton guns which are to be exhibited by the Minister of Marine. The track will be of the Decauville system, the steel rails being riveted to steel cross-ties. A part at least of the line will be laid with the "portable" track.

Iron Making at Bilbao.

One of the British consular reports contains the following data in iron making at Bilbao, Spain: The Altos Hornos Company have three blast furnaces, producing

tion broke up in February last through the Vizcaya Company producing in excess. The export of pig iron will probably fall off through producers not being able to compete in foreign markets—Italy excepted—and through the home demand, Bilbao pig iron having already driven out the English. The attention of producers is now more particularly directed toward promoting in the country various metallurgical industries.

The Altos Hornos Company, established in the year 1885, built the first Bessemer mills and rail mill. The works are now busily engaged for home supply, and already rule the home market. During 1887 the company were also putting up new plant for making open-hearth steel plates. The Vizcaya Company are erecting plant for a similar purpose, and also for the manufacture of galvanized buckets, sheets, tin plates, &c., a new industry in Spain. It is doubtful whether, in spite of the duties protecting this industry, it will be able to compete with English manufactures. The Spanish Government have called for tenders for the construction of three cruisers, on the understanding that preference would be given to local shipbuilding yards, foreign or native. The offers are three from the Bilbao iron works, two English and one French. Without waiting for the decision, an English company, the Naval Construction and Armament Company, have commenced the construction of a shipyard close to the Altos Hornos works, relying on the support of some Spanish firms, and expecting to obtain orders for cargo, mail and passenger boats from the steam navigation companies in Spain. From the many new lines of railway, the animation of different industries and the general satisfactory prospects there appears to be a good field for British enterprise here. Except mining, all industries in the Basque provinces are exempt from taxation, and foreigners enjoy the same immunities, privileges, &c., as natives. Many of the frontier mines in the districts of Galdames, Gallarta and Sommorostro, hitherto contributing largely to the exportation of ore, are becoming exhausted, and probably will be worked out in a few years. As they decline rich mines in the adjoining Sopueto district will be developed. Extensive preparations are being made for their working and the shipment of the ore via Castro, Povenena or Bilbao-luir.

The most favored project of several is to bring the Santander Railway to Bilbao via Trucios, through the Sopueto Valley—12 miles—and join the Deputacion Railway. If the scheme does not succeed capitalists and mine owners of the district purpose to make this railway by a private company, and in anticipation some mine dealers are getting hold of mining properties. Capitalists should be on their guard, and satisfy themselves through trustworthy sources as to the real ownership, importance and value of any mining property offered for sale. The works for the construction of a port outside the bar are to be commenced according to the plans, and under the direction of the engineer of the port, Don Evaristo de Churrua. The port, though not so spacious as those proposed by Sir John Coode and Mr. C. Vignoles, will be one of the finest commercial and naval ports in the world, and a harbor of refuge for the whole of the Cantabrian coast. A breakwater is to be made from the southwestern coast, starting at a point 2025 yards from the old signal tower of Portugalete, running in a north-westerly direction 1039 yards, then turning at an angle of 160° for a distance of 547 yards. From Begona Rocks, on the northeastern side, a counter breakwater is to proceed in a west-southwesterly direction for 1172 yards. The entrance will be between the breakwater and counter-break-

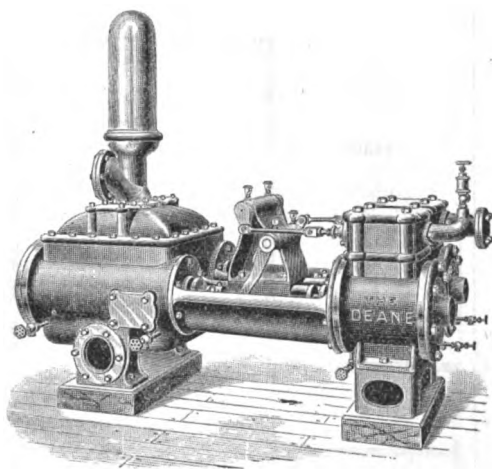


Fig. 1.—General View.

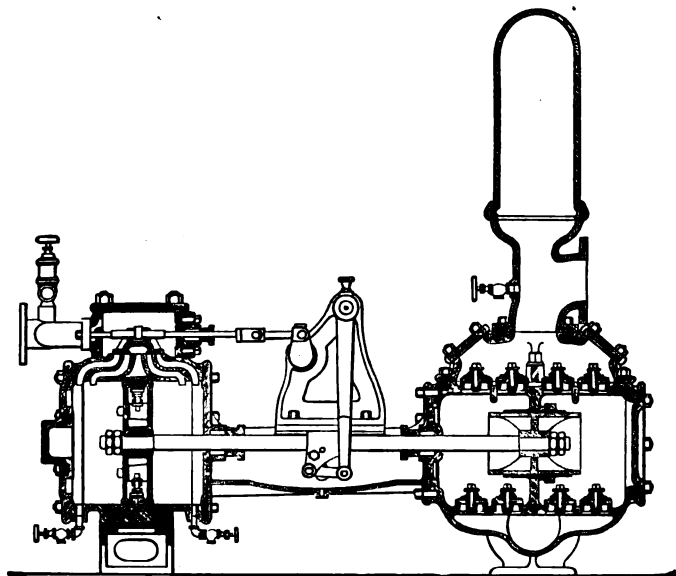


Fig. 2.—Longitudinal Section.

THE DEANE DUPLEX PUMP, BUILT BY THE DEANE STEAM PUMP CO., HOLYOKE, MASS.

is shown in the sectional view. In the steam piston may be seen the means for adjusting the packing rings. The action of the valve motion is also clearly indicated. In the water cylinder, it will be noticed that all the passages are direct and of ample size.

Small compound locomotives are to be used for hauling freight to the Paris Exposition of 1889. M. Decauville, the builder of portable railway plant and equipment, has issued a circular stating that there will be about 12½ miles of track of 22.68 inches gauge laid with rails weighing about 14 and 20 pounds per yard. The cars will be hauled by compound engines weighing 6½ tons empty and 12 tons in working order. Over these lines will be transported the

on the average 1800 tons a week, and export only the quantity produced in excess of their own requirements. To make 1 ton of pig iron requires from 17 to 18 cwt. of coke. The San Francisco Company have four blast furnaces with 13 Whitwell stoves. The pig iron produced amounts to 1200 tons a week, requiring from 19 to 20 cwt. of coke to the ton. The Vizcaya Company possess two blast furnaces, producing 1200 tons of pig iron a week, requiring about 18 cwt. of coke per ton. In 1887 the exportation of pig iron from these works increased by 76,368 tons, or 178½ per cent. Of this amount seven-tenths went to Italy, one-tenth to France, one-tenth to Russia. The above three works formed a syndicate for the sale of pig iron in Spain, but the associa-

of a box. Seven of these are provided, representing the ship-building yard of the company at St. Nazaire, the embarkation of emigrants, and various scenes on board one of the great vessels during a voyage. All of them are interesting, and the visitor moves slowly through the darkened passage-way, looking successively into the lenses, until his eyes have become accustomed to the feeble light, and the pupil has expanded so much as to be quite overwhelmed with the brilliancy of the great cyclorama, on emerging on the platform.

Lake Ore Shipments.

The *Marquette Mining Journal*, summing up the Lake Ore season from the shippers' standpoint, says:

Lake shipments for the season are practically at an end, and the figures show that the Lake Superior mines have sent more ore to market by water this year than in any previous year in their history. At this date a year ago, the last cargo for the season had gone forward. This year's shipments to date are 210,577 tons in excess of the total for 1887, and this will be slightly increased by a few cargoes yet to be reported from Escanaba. Compared with the shipments of 1886, the difference in favor of the current year is 1,107,248 tons. The rail shipments this year are known to be larger than ever before, so that it is entirely safe to estimate the output of the Lake Superior mines for 1888 at 5,000,000 tons, or about 300,000 tons more than their production in 1887.

The depression that prevailed during the earlier months of the season, and the improvement that set in later can be traced from the following figures, showing how the shipments of this year and last compared, month by month: On June 1 the mines were 90,837 tons behind the shipments by water on the corresponding date in 1887; on July 1, 161,905 tons; and on August 1, 245,065 tons. The reaction then set in, and September 1 saw the difference in favor of last year reduced to 222,887 tons. By October 1 it was cut down to 139,880 tons, and by the 1st of November it was not only wiped out, but a gain of 27,973 tons over last year had been made. This has since swelled to 210,577 tons, with the shipments yet to be reported to be added, to make the full excess over last year.

By ranges, the shipments are as follows:

Range.	1888.	1887.
Menominee	1,111,220	1,154,110
Marquette	1,815,402	1,755,328
Gogebic	1,223,334	1,081,872
Vermillion	433,607	302,081

Total,

By port shipments have been:

Port.	1888.	1887.
Marquette	844,604	803,411
Escanaba	2,181,452	2,072,708
St. Ignace	107,390	91,544
Ashland, Wis.	1,016,414	1,040,727
Two Harbors, Minn.	450,475	390,467

Total

Fourteen of the larger mines of the Marquette, Menominee, and Gogebic ranges have shipped by lake this season a total of 2,658,066 gross tons of iron ore, the shipments of each being as shown in the appended statement:

Name of mine.	Tons.
Lake Superior, Marquette range	228,593
P. & L. A., Marquette range	223,414
Republic, Marquette range	201,382
Cleveland, Marquette range	181,706
Champion, Marquette range	167,143
Chapin, Menominee range	267,729
Florence, Menominee range	139,421
Vulcan, Menominee range	120,541
Dunn, Menominee range	112,358
Iron River, Menominee range	107,143
Norrie, Gogebic range	379,204
Colby, Gogebic range	202,435
Aurora, Gogebic range	176,777
Ashland, Gogebic range	141,218

Total

This is over half the entire quantity shipped by water this season from all the mines in the Lake Superior region. The mines of the Vermillion range are omitted from this enumeration of the larger mines and their work, for the reason that we get only a "lump" report of the shipments from Two Harbors, Minn., and cannot, therefore, give the shipments of any of the mines on that range separately.

NEW PUBLICATIONS.

NOTES ON THE COMPRESSIVE RESISTANCE OF FREE STONE, BRICK PIERS, HYDRAULIC CEMENTS, MORTARS AND CONCRETES. By Q. A. Gilmore, Ph. D. Published by John Wiley & Sons, 8 vo. \$3.50.

This was the last published work of the author, general and engineer. At the time of his death he was probably the highest authority in the United States on the subjects of limes, cements, concretes and building stones. He had been employed by the Government on the reconstruction of the seacoast defenses, and on important river and harbor improvements, and had written several valuable treatises on these subjects.

The first chapter of this work gives a brief history of what had previously been done in testing these materials. It appears that a machine that would weigh no more than 100,000 pounds had not sufficient capacity to determine with sufficient accuracy the law of resistance, since crushing would be confined to small pieces. In Chapter II, notice is made of the A. H. Emery testing machine at the Watertown Arsenal, which weighs 800,000 pounds with extreme accuracy, and of the preparations made to use this machine for his tests. There are about 95 pages of experimental work upon various stones, cements, &c., and of various sizes, followed by a "summary", consisting of conclusions and suggestions. There are also eight folding strain sheets, which show to the eye the general law of resistance.

There is little to criticise and much to commend in the treatise. The extreme delicacy of the Emery machine, enabled the experimenter to measure with accuracy the amount of compression for the corresponding loads, and thus determine the elastic limit and the resistance of the specimens, which quantities were determined for the first time in the history of this science. (See pages 92 and 93, and elsewhere.) The elasticity of mortar and concrete is far from being perfect, and the term "elasticity" can be used, in regard to them, only in a restricted sense (page 91). Taking for the elastic limit that value beyond which there is a very decided change in the rate of compression, it is found that the modulus of elasticity of the mortar tested varied from 437,000 to 653,000 pounds per square inch, giving a mean of over 500,000 pounds. And concrete gave a mean of over 650,000 pounds. Dyckerhoff Portland cement gave a modulus of elasticity of 1,525,000 pounds to the square inch. This approximates to the value for good timber. The author finds a great difference in the resistance of cubes of stone and cement depending upon the beds, or substance interposed between the specimen and the machine. He finds that wooden cushions are not favorable, since they induce cleavage along the direction of the fiber. A thin coating of some material like plaster of Paris is essential, in order to secure uniformity of results. It was found by earlier experiments with Bera sandstone that the strength of cubes varied as the cube root of their edge; but this law was not confirmed by experiments upon larger cubes of Haverstraw freestone. Indeed, the question whether the compressive strength per square inch is greater for small cubes exceeding 1 inch than for larger cubes

if the material be homogeneous remains undecided. For a prism of less height than a cube having the same base, the resistance is greater. All the conditions of the experiments are clearly set forth, the results tabulated, and the conclusions properly based on the results of the experiments. De V. W.

TWENTY YEARS WITH THE INDICATOR. By Thos. Pray, Jr. Size, 6½ x 9 inches. 284 pages. Published by John Wiley & Sons. Price, \$2.50.

We need not refer at any great length to Mr. Pray's work on the indicator, the book having been before the public for several years, and having, at the time of its first appearance, been widely noticed. The point to which attention is to be specially directed is that the two volumes of which it consists, and which have heretofore been published separately, have been combined, and are now offered under one cover. The greater convenience of this, in several respects, will be readily appreciated. The lessons in the book are drawn from actual practice, a circumstance which materially increases their interest and value over purely imaginary cases, and a large number of diagrams, taken under the most widely varying conditions, are presented. In addition to the subject proper, other details of steam engineering, such as feed water tests for boilers, measuring chimney draft, safety valve problems, &c., are considered, and steam and hyperbolic logarithmic tables are added.

BOILER CATECHISM. By Robert Grimshaw. Size, 4 x 6 inches. 402 pages. Published by the Practical Publishing Co. Price, \$2.00.

Mr. Grimshaw's "Boiler Catechism" is similar in character to his several pump and steam engine catechisms published within the past few years, and noted by us in earlier issues. It is intended for what are currently known as practical men, boiler attendants in other words, and the more advanced reader will therefore, scarcely find in it what he might be led to expect in a work on boilers. The information is given in the shape of answers to questions, such as are apt to suggest themselves to one in charge of a boiler in the course of every-day work. It will be apparent from this alone, that the book must necessarily contain considerable material of practical value, and an examination will, in a great measure, confirm this. Altogether, the end aimed at has been fairly well accomplished, and the information given will, no doubt, prove serviceable to many.

Referring to the exception which has recently been taken by English papers to the statement that the 335-foot boiler chimney of the Clarke Thread Company, at East Newark, N. J., is the tallest in the world, it may not be amiss to point out that the chimneys at St. Rollox and Port Dundas, near Glasgow, Scotland, which rise to 436 and 454 feet, respectively, are not boiler chimneys, but were designed and built simply to carry off noxious vapors from chemical works. The East Newark chimney, therefore, still stands unparalleled as a means of producing draft for steam boiler furnaces and the original claim to distinction is fully substantiated by facts.

According to *Engineering*, the recent sale of the hull and fittings of the steamer Great Eastern realized over £43,000, the copper bringing £2960, the gun-metal, &c., £4480; brass, £3980; lead, £4185; outer iron plates, £12,500; inner iron plates, beams and rivets, £12,230, and anchors about £300. The breaking up of the steamer will commence on January 1, will occupy a year and will probably cost in labor from 10/ to 15/ per ton of material.

New Lake Tonnage.

The Cleveland *Plain Dealer* publishes tables showing the new tonnage for 1888 in the great lakes and the losses of lives and shipping during the season. It says: The season of 1888 will be memorable in the history of lake navigation for many reasons, not least of which is the light loss of life and property from shipwreck. Old mariners fail to recall the time when the season, as a whole, has been so free from disastrous storms. November, the month most dreaded by mariners, passed without a blow worthy of being called a gale. A list of lost boats foots up 48, with a carrying capacity aggregating 17,700 tons, and a total valuation of \$439,400, but these figures represent barely half the losses of 1887, when 70 boats, capable of carrying 34,400 tons, and valued at \$777,700, went out of existence. A year ago 116 souls went to the bottom in a series of ruinous storms that swept over the entire chain of lakes, while this year only 16 lives were lost from actual shipwreck.

The season of 1888 has gone, and the surroundings capable of indicating the prospects for next year are of prime interest. For three years past the strides made in navigation on the great inland water has been a surprise to this whole country, and it is only of late years that this national industry has received a fair part of the attention which it deserves. In the winter of 1886-87, when 31 boats, valued at something more than \$4,000,000 were turned out of the shipyards of the lakes, the attention of the whole country was directed in a measure to the importance of a business that interests Cleveland particularly, and when a year ago the large volume of new work was followed by 60 more ships, capable of carrying 108,525 gross tons, and costing \$8,325,000, grave fears were expressed by the vessel owners and shippers as to "whether the thing was not being overdone." The vessels were floated, and their owners have tied them up for the winter abreast of sister ships that have seen more time of service with a profit for all that will compare favorably with that of any other branch of business in this country. It is sufficient to say that the earnings of lake carriers during the past season, together with prospects of the future, are such as to cause arrangements for a duplication of last winter's work in the shipyards of the lakes during the winter at hand. Fifty-nine boats, with a carrying capacity of 100,950 gross tons a trip, and costing \$7,124,000, will be put afloat some time between now and the middle of next summer.

One big craft, worthy of mention, but not included in the list, on account of the peculiar business to which she is adapted, is a big steel ferryboat, now about completed at the yard of the Cleveland Shipbuilding Company. This remarkable steamship will cost, when complete, about \$325,000. She will be used to convey the trains of the Michigan Central Railway across the Detroit River. Twenty-four loaded cars is her capacity. She will be propelled by monstrous power, and she is constructed so as to go through ice of 2 feet in thickness. The owners of this boat will send her across Lake Erie about January 1, and they express no fear of the ice obstructing her passage.

Bronze for Copper.—*La Nature* gives the following receipt for bronzing copper: "Dissolve in 50 litres (11 gallons) of hydrochloric acid as much as possible of iron in fine wire or scales. When the liquid is saturated a deposit will form at the bottom. Then add 1 kg. (2.2 pounds) of arsenious acid, and stir vigorously. When the acid is dissolved the bath is complete. The objects to be bronzed are connected to the negative pole of a battery, the oppo-

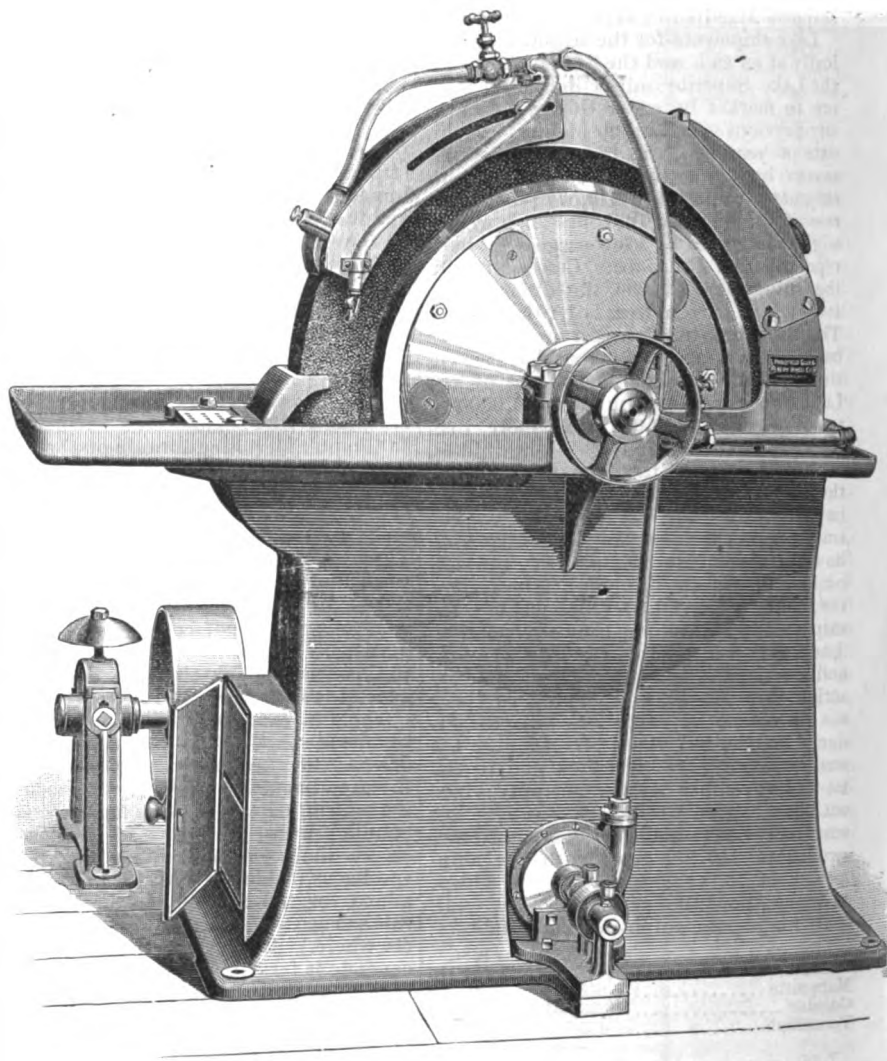
site electrode being formed of rods or plates of retort carbon. Articles of copper or brass become black at once, but those of iron are attacked by the bath. It is therefore necessary to nickel the latter. In order to preserve the deposit of iron the surface must be lacquered."

Improved Emery Wheel Tool Grinder.

An improved form of emery wheel tool grinder is at present being turned out by the Springfield Glue and Emery Wheel Company, of Springfield, Mass. As shown in the cut on this page, it is a very heavy machine, weighing over 2200 pounds, and the base

sight (except when the doors are open). Having the pump connected to only the lower tank leaves the upper tank free from pipe connections, so that it can be quickly emptied.

The table has sufficient pitch from all sides toward the wheel to prevent the water standing on the machine. It has self-oiling bearings 8 inches long, a 24-inch steel spindle and carries an emery wheel 36 inches in diameter and 4 inches thick, with a 24-inch hole. The wheel is held by large collars. Owing to the large hole there is no wheel-hub or center to throw away, making a large saving in the cost of future wheels. The collars are arranged so that the wheel can be quickly



IMPROVED EMERY WHEEL TOOL GRINDER, BUILT BY THE SPRINGFIELD GLUE & EMERY WHEEL CO., SPRINGFIELD, MASS.

has sufficient flare to give it a very solid floor foundation, which prevents vibration when being used.

An iron tank, easily reached, is placed inside of the base under the wheel to receive the water coming from it and catches the waste ground off, which quickly settles to the bottom. When sufficient collects the tank can easily be drawn out and emptied. The water overflows from this tank by means of a syphon, which takes the water enough below the surface to prevent its collecting any oil or scum, and, conducting it into a second tank directly underneath, to which a centrifugal pump is attached, arranged to carry water to the wheel, where valves regulate the flow to any desired amount. The water flows onto the wheel through a small opening on the under side of the water spreader, which is made of brass, giving an even sheet of water across the width of the wheel. The tanks, being inside of the base, are out of

balanced. There is a hinge door on the back side of the hood, easily arranged, so that long, heavy tools can be ground on that side in good shape, the water coming on just below this opening to prevent any heating of the work. The machine stands 36 inches high from floor to center of spindle, and covers a floor space of 24 x 48 inches.

John Baird, of Philadelphia, was chosen president of the board of trustees to carry into effect the will of the aged philanthropist, Isaiah V. Williamson, for the proposed Free School of Mechanical Trades, and a site will soon be selected.

The Finance Committee of the Philadelphia Councils recommend the expenditure of \$3,700,000 for permanent improvements the coming year, in addition to the regular appropriations. The largest item is for a reservoir.

THE WEEK.

The Chamber of Commerce of New Orleans and the Produce Exchange have declared in favor of consolidation and the organization of a strong Board of Trade that will be able to work more successfully than the present commercial bodies working separately.

Representative Stewart, of Georgia, introduced a bill in Congress to establish a graduated income tax, the proceeds of which are to be applied to the payment of pensions. It provides that all individuals, corporations and estates receiving an annual net income of \$5000 and upward shall be assessed in proportion to said income. Incomes from \$5000 to \$10,000 are to pay 2 per cent.; from \$10,000 to \$25,000, 3 per cent., and so on. Most people have been of the impression that the Treasury receipts were already large enough for practical purposes.

A prominent shipping-house of this city has received numerous replies to recent inquiries from this side addressed to various parties in the United Kingdom respecting the outlook for American wheat and flour in British markets. The inference is drawn that, owing to the high price of the American product, mainly due to speculation, it is not improbable that our foreign trade in cereals may continue to suffer. Besides liberal supplies of Russian wheat of a fine quality, the finest qualities of Hungarian patents can be bought considerably below Minnesota patents. Both Hungarian and North German mills have taken advantage of the situation and sold heavily. As to future supplies, London dealers profess to anticipate no important rise in prices, to meet the American level. While it is admitted that England can expect little or nothing either from India or Australia before another season, it is obvious that the United States encounter sharp competition in all the European food markets, not only as respects grain, but in provisions, dairy products and other leading staples. Furthermore, artificially "pegging up" prices by unscrupulous speculators of the "Old Hutch" pattern is calculated to make foreign purchasers more independent so long as this vicious course is continued.

Consul-General Bassett, the Haytian representative in this city, is of Spanish descent, but is a native of Connecticut, and resides with his family in New Haven because of the social and educational advantages afforded to his family there. His oldest son is a student of Yale. Mr. Bassett has represented Hayti in this country since 1879.

The old Erie building, on West street, at the junction of Duane and Reade streets, was leased to Deane & Co., bankers and warehousemen, for a term of ten years, at \$31,000 per annum. The Erie Railway Company had been paying the city, by whom it is owned, \$17,000 and taxes. It is proposed to convert the first story into butchers' stalls.

Vessels navigating the lakes are allowed a reduced premium by the marine insurance companies if they are provided with oil to lessen the dangerous effect of heavy seas. Two quarts an hour is all that is needed under ordinary circumstances, although in the case of long tows that amount could be doubled. Experience on the ocean has demonstrated that thick and heavy oils are generally the best.

The Nicaragua Canal project is again brought into prominence by a bill introduced in Congress to incorporate the Maritime Canal Company, of Nicaragua. It is thought in Washington that the bill has little chance of becoming a law. The

vested interests of the Pacific railroads and of the Panama Canal are well represented, and although there appears to be a majority of the House favorable to the measure the minority is strong enough to defeat it.

The pneumatic gun cruiser just completed for the United States Government will be able, according to Park Benjamin, to throw against an enemy, 1500 yards distant, 1800 pounds of nitro-glycerine, the explosive energy of which equals that of about 3400 pounds of dynamite, or more than ten tons of gunpowder, and this can be repeated every two minutes.

Geo. Westinghouse, of Pittsburgh, instead of bringing natural gas to the manufacturers now proposes to take the furnaces to the natural gas. With this object 600 acres have been purchased as the site for a new town, 6½ miles from Murrysburg, whence Pittsburgh derives its present supplies, by means of a pipe line 22 miles in length. The new town of Turtle Creek property will be occupied by mills and factories.

A number of prominent merchants in this city in a debate before the Chamber of Commerce discussed the proposed removal of the custom house, and the weight of opinion favored the enlargement of the building now in use; and in reference to the location for the new Government buildings a resolution was adopted, after some opposition, in favor of an uptown site rather than one near the Battery.

A Constantinople dispatch says: "The Porte has signed a convention with Seligman's banking firm permitting the junction of Turco-Greek railways, English, German and French tenders for which were rejected by the Porte for political reasons." Messrs. J. & W. Seligman & Co. confirm this, but say they have as yet no details. The project, which is to build a road to the boundary line of Turkey, will involve the expenditure of about £5,000,000.

The Secretary of the Navy has appointed Captain W. T. Mahan, Commander C. M. Chester and Lieutenant-Commander C. H. Stockton a board to select a site for a navy yard on the northwest coast of the United States.

The subject of industrial education was discussed by Dr. Samuel Eliott, Dr. John G. Blake, Prof. J. D. Runkle, of the Institute of Technology, and several others at a meeting of the Boston Boot and Shoe Club, held last week, and a resolution was passed favoring the extension of the public school system of that city so as to offer advantages to those who desire to fit themselves for mechanical occupations, as well as for professional or commercial pursuits. In Pennsylvania the Commissioners of Industrial Education and the principals and trustees of the State Normal Schools had a conference in Harrisburg on the subject of manual training in the public schools, and a resolution was unanimously adopted declaring that the principals were heartily in favor of the object.

Refugees from Jacksonville, Fla., may return December 15.

The State of Nevada is losing inhabitants. The total vote in 1886 was 21,660. This year it has fallen to 12,278. The question is asked with much pertinence—"What population does that indicate in a State entitled to one Representative in Congress, and to equal representation with New York, Pennsylvania or Ohio in the Senate of the United States?"

The Inter-oceanic Railway, the only line in Honduras, extends from Puerto Cortez, the chief port on the Atlantic Coast of the republic, to San Pedro, a distance of 37 miles. As it controls the bulk of Ameri-

can trade with Honduras, an effort is making in New Orleans to put it in good working order under a Government lease to General Kraft for 26 years.

The American Federation of Labor, which met in annual convention at St. Louis, on Tuesday, is now the largest and most powerful labor organization in the United States. It has a membership of 650,000, which is still increasing. The Knights of Labor have but 200,000, and, from present reports of the recent withdrawal of the miners and others it is growing less.

The effects of the Sugar Trust are shown definitely in figures. The prices of the two leading grades of raw sugar and of three grades of refined sugar on October 1, 1887, a few days before the trust was completed, and on October 1, 1888, one year later, are as follows:

	Oct. 1, 1887.	Oct. 1, 1888.	Advance.
Fair refining.....	4½%	5½%	%
Centrifugal.....	5 7-16	6½%	1 1-16
Cut loaf and crushed	6%	8½%	2
Granulated.....	6	7½%	1½%
Coffee A. standard..	5½%	7%	1½%

It will be seen that the price of cut loaf and crushed sugars was 2 cents a pound higher on October 1, 1888, than it was one year earlier, and that the advance for the other grades had been 1½ cents.

A short outlet for coal from the Clearfield region to Eastern New York and all of the New England States will be provided by a railroad now building between Binghamton and Williamsport. Large quantities of coal are being moved at Bernice at a low cost. The new road also penetrates a tract of country heavily timbered.

A contract has been executed between the Hudson Suspension Bridge and New England Railway Company and the Lehigh and Hudson River Railway Company, by which the latter is to send over the Hudson Suspension Bridge, now being constructed from Anthony's Nose to Fort Clinton, all freight, passengers and mail and express matter and other railroad traffic and business originating west of the Hudson River and destined to points on the east which the Lehigh and Hudson River Railway Company may be able to control, and which can be practically and profitably carried by that route. The contract covers a period of 50 years.

The stockholders of the Shipowners' Dry Dock, at Cleveland, have raised their capital stock to \$200,000, for the purpose of establishing a shipbuilding plant.

A monster 200-ton gun, to carry a projectile weighing 2 tons, is being made at the Woolwich arsenal for coast defense. It is expected to prove effective within a distance of 15 miles.

Joseph Oat, whose name has been prominent in the coppersmithing business of Philadelphia for many years, died in that city last week, aged nearly 93 years.

In the case of Brown & Bros. against Wm. H. Brown and the executors of the estate of Philo Brown, Judge Fenn, of the Superior Court, in Waterbury, Conn., holds that the plaintiff shall receive \$125,000, the amount of a note given by Philo Brown for money and assets of Brown & Bros. loaned to Wm. H. Brown when he was manager of the New York Star.

The annual report of the Chief of Treasury special agents on the operations of the Immediate Transportation service says that during the past fiscal year 1,738,653 packages of merchandise, of the invoice value of \$38,929,000, and estimated duty of \$21,218,538, were forwarded without appraisement under this system. Of \$38,929,000 of merchandise handled, \$25,012,000 was imported at New York, \$3,751,-

000 at San Francisco, \$2,777,000 at Baltimore, \$2,679,000 at New Orleans, \$2,481,000 at Philadelphia, \$585,000 at Port Townsend, and smaller amounts at the eight other ports named. Of this aggregate, \$11,496,000 was finally delivered at Chicago, \$5,029,000 at Philadelphia, \$4,182,000 at San Francisco, \$3,205,000 at St. Louis, \$2,614,000 at Cincinnati, \$2,515,000 at New York, \$1,912,000 at Boston, and smaller amounts at the other ports mentioned in the list.

The chief of the alleged Burlington dynamite conspirators, John H. Bauers, was on trial at Geneva, Ill., last week, and John A. Bowles, the most important witness, testified that on a number of occasions he had been hired by the defendant and received various sums of money with which explosives were purchased and used in the destruction of rail tracks and other property.

Cotton mills in New England are enjoying a period of exceptional prosperity. The annual statements of several Fall River concerns are significant. During the past year the Wampanoag Mills have earned \$157,000 on \$750,000 capital, and have paid \$86,350 in dividends. The Union Cotton Company earned \$237,000 and divided \$187,500 on \$750,000 capital. The Granite Mills cleared \$136,000 and distributed \$64,600 on \$400,000 capital. The Sagamore Company, capitalized at \$600,000, earned \$133,000 and divided \$78,000. The balance between the earnings and dividends, save what is carried to surplus, represents allowance for depreciation of plant, improvements, &c. The Amoskeag Company, the great Manchester concern, which, on the whole, is probably the most profitable corporation in New England, has cleared \$425,000 this year, out of which it has paid 25 per cent. dividends, leaving over 4 per cent. in addition for surplus.

The United States dynamite cruiser Vesuvius made her first trial trip this week and succeeded in making a speed of over 21 miles an hour, 1 mile and more faster than required by the contract with the Government.

Discouraging accounts are received from Central and Western Kansas, caused by the abandonment of farms in consequence of losses of crops and cattle from the protracted drought of last summer. A letter from Salina, Kan., says: "As a whole, Central and Western Kansas did not this year make one-fourth of a corn crop. All through the desolate, scorched region wheat made a fair crop and the grain fetched a remunerative price, but there was not sufficient quantity of that grain raised to tide the farmers over their financial embarrassments. Bankruptcy stalked over the plains of Western Kansas and struck down hundreds of farmers. The financially ruined agricultural people who till arid-zone land have very generally decided to fight no longer against nature. It is estimated that at least 5000 mortgaged farms in Central and Western Kansas have already been abandoned, and the exodus has been commenced. It is not a mortgaged farm here and another yonder, as it is in New York, but almost all farms are mortgaged. In the western counties of Kansas the mortgages are of small face value, but in the 'Golden Belt' region of Central Kansas as high as \$3000 has been frequently loaned on 160 acres of agricultural land. But when a farmer tills incumbered land with incumbered tools that are drawn by mortgaged teams, and a fiery wind burns up two consecutive corn crops, it is evident that he cannot pay interest money—it matters not the size of his mortgage—pay taxes, and live."

The report and findings of Referee John A. Shields in the suit of the Webster Loom Company against Elias S. Higgins & Co.,

the carpet manufacturers, involving the patent-right of the wire motion weaving machines, was made to the United States Circuit Court in this city on the 6th inst. The defendants placed the invention on 61 of their looms in 1873, and after manufacturing 82,000,000 yards of carpet the Webster Loom Company secured an injunction and put in a claim for royalties. The Webster Loom Company claimed \$2,631,575.64 damages, and expert testimony without end has been produced. The report of the referee just made was again in favor of the defendants. "I am forced to find and report," said the referee, "that the complainant has failed to establish by trustworthy legal proof any basis upon which the gains, profits or advantages realized by the defendants by reason of the infringement complained of can be computed."

Representative Butler proposes that Congress shall appropriate \$1,000,000 for a 60-inch telescope. The largest instrument in the world, in Lick Observatory, has a glass 36 inches in diameter, but the Tennessee man will be satisfied with nothing less than 5 feet. With reference to this proposition, Alvan Clark, the renowned maker of lenses, says that he does not believe any better results can be obtained by constructing so large a glass—that is, provided it is located on the Atlantic slope. As to the possibility of constructing such an immense lens, Mr. Clark will only say that it can be done if the glass can be cast, but such a thing was never before dreamed of.

The largest coal dock in America will be built at once at West Superior by the Eastern Railway Company. It will be 2000 feet deep and 800 feet wide, with a central vessel slip 2000 feet long and 100 feet wide, giving 8700 feet of dock frontage for unloading. Car tracks will run all through the structure, which will have a storage capacity of 1,500,000 tons of coal.

Cleveland, Ohio, seeks coal direct from Martin's Ferry, W. Va., and local capitalists are about to extend the Cleveland and Canton Railroad to form a part of the South Pennsylvania and Ohio scheme.

A contract was closed on Saturday with the East End Electric Light Company, a Westinghouse concern, to illuminate the entire city of Pittsburgh. To do this it will require 2000 400-candle-power arcs and 2800 25-candle-power incandescent lights, at a cost of \$120,000 per annum.

Forty large English steamships, the Philadelphia Record says, have within the past week been chartered to bring iron ore from various Mediterranean ports to that port. These steamships, which are of that class of sea rovers known as ocean tramps, have a tonnage capacity of 55,000 tons and carrying capacity of 75,000 tons.

Consul Loening, of Bremen, in a report on the commerce of that port, shows that the value of the imports from the United States has increased from \$22,083,250 in 1871 to \$42,881,312 in 1887, and the exports to the United States increased from \$16,607,188 in 1871 to \$20,058,175 in 1887. The imports from the United States are more than four times as great as from Great Britain or from Central and South America combined, while the exports to the United States are four times as great as to Great Britain and more than nine times as great as to Central and South America combined. The importance of Bremen as a cotton port appears from the fact that she imported from the United States in 1887 cotton to the value of \$29,610,500, an increase of more than \$10,000,000 over 1886. Out of 2879 vessels, with a total of 1,444,683 tons, only one vessel of 1270 tons carried the American flag.

MANUFACTURING.

Iron and Steel.

The citizens of Jefferson, Tex., have donated property to secure the building by John Kruse, of Chicago, of a blast furnace

Under date of the 6th inst. S. McClure, agent of the Stewart Iron Company, Limited, at Sharon, Pa., writes us as follows: "Our No. 1 stack was put in operation on Monday last. We now have our two blast furnaces running, and 13 puddling furnaces in our mill running single turn of five heats per turn—product, blooms, muck bar and billets—the same being used for making open-hearth and crucible steel. All the iron works in the Shenango Valley, with the exception of the Wheatland Mill, are in operation."

The Bessemer department of the plant of the Columbia Iron and Steel Company, at Uniontown, Pa., will be put on double turn as soon as the necessary arrangements can be made. The other departments have been running night and day for some time past.

James P. Witherow, engineer and contractor, of Pittsburgh, is bidding on seven new iron and steel plants to be erected in the South during the next year, with good prospects of securing them. Mr. Witherow states that the next year promises to be the biggest year in the erection of iron and steel works this country has ever seen. These seven contracts will in the aggregate amount to over \$1,000,000, and are to a large extent being erected by Northern capital. The extensions now being made at the works of Mr. Witherow, located at New Castle, Pa., are almost completed, and will increase the capacity of the works about one-third. They will then give employment to some 200 new men, making a total of about 600 men employed. The firm have already work on hand that will keep them busy for the next three months.

A rumor was published in the Pittsburgh papers last week to the effect that a wholesale discharge of employees had taken place at the works of the Edgar Thomson Steel Company, at Braddock, Pa. Upon investigation we find that there is little truth in the rumor. About 40 men have been discharged, the majority of them being metal-handlers. The reason given for the discharge of these men is that navigation has closed, and, consequently, their services were not required.

A rumor is published that the old Wampum Furnace, at Wampum, Pa., which has been out of blast for some years, has been purchased by some capitalists of Pittsburgh and the Shenango Valley, and will be rebuilt throughout and again put in blast. Among the advantages set forth are the excellent railroad facilities and the fact that native ore and limestone can be procured in the vicinity of the furnace. It was erected in 1856, and has already been partially dismantled.

The officers of the Pottstown Iron Company, at Pottstown, whose nail factory has been lying idle during the past two or three weeks, have requested the nailers to accept a reduction of 25 per cent. The feeders are already working at bottom figures. At a conference of the employees held on the 7th inst., the men gave the company to understand that they would prefer a reduction of working hours instead of a reduction in wages as contemplated, if the company found it necessary to make a change after January 1.

The Findlay Rolling Mill Company, of Findlay, Ohio, are operating their new chain works in all departments, and are working thirty-four fires on coil and cable

chains, $\frac{1}{2}$ to 2 inches. This firm some time ago purchased the plant of the Stirling Chain Company at Cuyahoga Falls, Ohio, and removed it to Findlay.

Chester Furnace, at Chester, Pa., operated by the Chester Rolling Mills, which has been idle since March last, resumed operations last week. It has a capacity of about 125 tons per day.

Plans and specifications have been drawn up by Carnegie Brothers & Co., Limited, proprietors of the Edgar Thomson Steel Works, at Braddock, Pa., for the erection of a foundry and machine shop at Braddock. The intention of the firm in putting up this structure is to make all their own castings for the blast furnaces, &c., which work they have always been obliged to get done by outside firms. A 15-foot boring mill has been ordered for the machine shop.

Oley Furnace, at Semple, Pa., owned by the Clymer Iron Company, which has been idle for some years, is being dismantled. It is one of the oldest furnaces in the country, having been erected in 1772.

North Penn Furnace, of the Bethlehem Iron Company, at Bingen, Pa., was blown out last week and will remain idle for an indefinite period. The limestone quarries in that vicinity have also ceased operations.

When the large blast furnace of the Etna Iron Works, Limited, at Ironton, Ohio, was erected in 1872 only one of the twin stacks was completed. The Alice stack was finished, but Blanche was left unlined and incomplete. Blanche has recently been relined and was blown in last week. The work of lining has been going on for months. It has cost about \$23,000, including all necessary changes and additions, and over 400,000 brick, including red and fire brick, have been used. Meanwhile Alice has been blown out and the engines and Whitwell ovens used for that furnace have been connected with Blanche. It is probable that the Alice stack will be blown in again after the first of the new year. Sarah furnace, also owned and operated by the above-named company, has been blown out and will be relined and repaired at once, with a view of blowing in again about the first of the year.

Thus far about 125 employees of the pipe mill of the Reading Iron Works, at Reading, Pa., have been discharged, and it is said that others will follow.

The Keystone Rolling Mill Company, of Pittsburgh, are erecting two new puddling furnaces at their plant on Second avenue in that city.

Etna Furnace, of the Etna Iron Works, Limited, at Newcastle, Pa., has broken twice recently her best previous record. In 24 hours her output in the two turns included in that time was respectively 85 and 83 tons, making a total in the 24 hours of 168 tons. The furnace surpassed even this record subsequently. In 24 hours the furnace produced 170 tons of iron. These records are more remarkable from the fact that the Etna has but two engines and two hot-blast stoves. The furnace, when the above was accomplished, used soft Lake ores.

The new blast furnace of Laughlins & Co., of Pittsburgh, now in course of erection, will be one of the largest blast furnaces in Allegheny County. It will be 22 feet bosh and 80 feet high. There will be four hot-blast stoves 21 feet in diameter and 80 feet high. The foundation for the furnace is finished and the ironwork is being put up. The ironwork for the stoves is nearly finished. The engine-house, stockhouse and boiler-house are all in course of construction. It is expected that the entire plant will be completed by May 1, 1889. The furnace is the same

size as Furnace F, at the Edgar Thomson works, which is the largest, and which has broken the world's record. Riter & Conley are the contractors and engineers of the ironwork, and W. G. Wilkins is the engineer in charge of construction of foundation and buildings.

Lynchburg Furnace, at Lynchburg, Va., which has been undergoing repairs for the past five months, has resumed operations. The repairs which have been made to the furnace are extensive, and consist of entire new fire-brick, from hearth to hopper, new bosh and crucible jackets, new bell and hopper, new sheet-iron roofs. All the machinery, boilers and pumps were overhauled, and new trestles and floors were made to the stackhouse. The capacity of the stack has been increased to 50 tons per day. The furnace and plant, which belong to the Lynchburg Iron Company, have been leased for a term of years by J. Risque Hutter, who will have immediate charge of the business.

The Terre Haute Iron and Nail Works will, in all probability, soon abandon the manufacture of nails, the owners of the works having had a sufficient experience in that line. They have some material on hand to work up, which will keep the factory running for some little time. The fate of the plant has not yet been decided, but a portion of the rolling mill may be adapted to other uses, now under consideration by neighboring manufacturers. The owners, it is understood, will entertain proposals from parties desiring to engage in any branch of manufacture for which the remainder of the works may be found suitable.

The new furnace at Trussville, Ala., is practically completed. It will go in blast in January. It has been erected by Pennsylvania men of life-long experience in iron and coke making, and is one of the best built coke furnaces in Alabama. Its blowing, heating and boiler power is much greater than actually required, giving ample reserve in case of need. It will make 100 tons per day.

The second stack of the Woodward furnace plant in Alabama has gone into blast, and both furnaces are now running successfully, making an average of 200 tons per day. The Woodward has been one of the most successful of all the Southern iron-making enterprises, owing to able and energetic management.

The new furnace of the Gadsden Alabama Furnace Company, making the Etowah brand of coke iron, has got up to 120 tons per day. It is handled by the widely-known founder, John Dowling, formerly of Rising Fawn Furnace. The iron is very tough and dark, resembling charcoal iron. It is rumored that L. S. Colyar, president of the company, will retire in December.

There is a large charcoal furnace under construction at Attalla, Ala., which is built to make high grade Alabama car-wheel iron, like Woodstock and Shelby. It is near Anniston, and will use the same class of ores as the well-known Woodstock. The aim will be to make chilling grades only. It will be completed by February 1.

Nearly all of the leading Alabama coke furnaces have very decidedly improved the character of their iron in the past year or two. Some of the iron now being made by Sloss, Woodward, Mary Pratt, and Etowah will rank with the best produced in the country for color, toughness and high grading.

The Chicago Crucible Steel Casting Company have been delayed and disappointed with their new furnaces and gas-producers at their works, located on Elston and Webster avenues, in Chicago. They

had already put in eight crucible steel furnaces and one open-hearth furnace, with five gas-producers, of a construction strongly recommended to them; but the system turned out to be a total failure for melting steel, and caused great loss and delay to the company, as well as to their numerous customers. The company have now pulled down these furnaces and entrusted Lean & Blair, of Pittsburgh, with the contract for new Siemens furnaces of the most approved and well-tried construction. This firm have gone very energetically to work, and will have the first five sets of crucible furnaces and the large drying ovens, together with Siemens producers for the same, ready for use by the 15th of this month, to be followed by a large 48-pot furnace and a 10-ton open-hearth furnace of the Lash pattern. The customers of the Chicago Crucible Steel Casting Company will, therefore, be able to get their castings during the last half of the month of December, as the company will work their furnaces night and day to catch up with some of their orders.

The Central Iron and Steel Company, of Brazil, Ind., have added a department to their works for the manufacture of turn-buckles used by bridge builders and others. The new department consists of a train of rolls, with the necessary heating furnaces, four presses, a special machine, with six spindles to tap the buckles right and left, a large bolt cutter, lathes, &c. It is housed in a neat ironclad building, erected for the purpose, and is under the special management of Mr. Williams, formerly with the Cleveland Forge Company. A feature in the work introduced by him is the manufacture of the buckles in two pieces instead of four, which has hitherto been customary.

Isabella Furnace No. 1, of the Isabella Furnace Company, at Etna, Pa., near Pittsburgh, is 18 feet bosh, 75 feet high, 11 feet hearth, and 14 feet at the top. This furnace has made the following number of tons of Bessemer pig iron for the weeks ending as noted below:

	Tons.		Tons.
October 6.....	1,655	November 10.....	1,503
" 13.....	1,564	" 17.....	1,798
" 20.....	1,685	" 24.....	1,778
" 27.....	1,665	December 1.....	1,522
November 3.....	1,698	" 8.....	1,766

This is a total of 16,634 tons in ten weeks, or an average of 1663 tons per week. It is certainly a very creditable record.

The Philadelphia and Reading Railroad Company have purchased the property of the Allentown Iron Company, at Allentown, on which will be located the terminal, which the company will build as a connection between the East Penn and Jersey Central roads through Allentown. The property purchased contains three blast furnaces, two of which are in operation. As soon as the transfer was made George F. Baer, of Reading, a Philadelphia and Reading director, was elected president, and Albert Broden was chosen general manager of the Allentown Iron Company.

At a recent meeting of the stockholders of the Decatur Land Improvement Company, of Decatur, Ala., Mr. C. C. Harris was elected president of the company, to succeed Major E. C. Gordon, who recently resigned.

On the night of the 28th ult. the explosion of a lamp in the engine-room of the nail factory of the Duncannon Iron Company, at Duncannon, Pa., caused a fire which totally destroyed the factory and its contents, including 64 nail machines. The blast furnace, rolling mill, foundry, nail warehouse, &c., were not injured. The loss is estimated at over \$30,000, about covered by insurance. The factory was an old wooden building, and

the company expect to replace it with a fire-proof structure with all the newest appliances for nail manufacture.

Machinery.

The Montreal Rolling Mills Company, Montreal, have decided to enlarge and improve their mills. S. T. Williams & Co., Philadelphia, being appointed contracting and consulting engineers.

The New York Belting and Packing Company, manufacturers of rubber belting, packing and hose, have recently opened a branch house in San Francisco, Cal., which will be under the control of Messrs. Arnett & Rivers and located at 17 and 19 Main street, that city.

A press dispatch from Susquehanna, Pa., under date of the 7th inst., reads as follows: "The New York, Lake Erie and Western Railroad Company having decided to have the work performed in Buffalo and elsewhere by outside contractors, the extensive foundry and steam hammer department of their shops here will be closed. About 200 men are employed."

The Ohio Brass Company, of Mansfield, Ohio, have been incorporated; capital, \$25,000.

The Main Belting Company, of Philadelphia, are running very full on their cotton belting, for which they have a steadily increasing demand. The electric light companies are using these belts very largely and with entire satisfaction, judging from the number of commendatory letters which they are receiving.

Byram & Co., of Detroit, Mich., exclusive manufacturers of the Colliau cupola furnace, have recently placed four of their large-sized Colliau cupolas in the new shops of the United States Rolling Stock Company, Anniston, Ala., and besides other orders have a contract with the C. A. Treat Car-Wheel Works, now locating plant at East Chicago, for two large size Colliau cupolas.

Among the recent sales of the Sioux City Foundry and Machine Works, Sioux City, Iowa, are two of their 75-horse-power Corliss engines, for the Pioneer Press building at St. Paul, Minn.; also two 75-horse-power Corliss engines, sold for electric-lighting purposes, one going to James Bell, David City, Neb., and the other to the Storm Lake Electric Lighting Company, at Storm Lake, Iowa. The first of the new line of sizes, a 10 x 16, of Giddings' single valve automatic engines, also built by the works, was sold some time since, together with a boiler, to go to the Chillicothe Water, Gas and Electric Light Company, Chillicothe, Mo. They have also a large force of pattern makers at work, bringing out a full line of sizes of this engine, which is known in the East as the Russell Automatic. In addition to this, the works have recently sold several large boiler plants, together with a number of combined outfits, for the Erie Engine Works, manufactured by Cleveland & Hardwick, of Erie, Pa., for whom they are Western agents. They are busy improving their works, and are putting in at present a 90-inch fly-wheel lathe, also an overhead traveling crane, 30-foot span and 7 tons capacity. Their foundry department is driven to its utmost capacity, being obliged to work evenings in order to get out steam engine-work, in addition to a large amount of architectural ironwork.

President Acheson and Secretary Painter, of the Tubular Wheel Mfg. Company, have been at McKeesport, Pa., to look into the question of locating at Bissell, near McKeesport.

The Hussey Re-Heater and Steam Plant-Improvement Company, of No. 15 Cortlandt street, New York, have just issued a

number of circulars and catalogues setting forth the advantages of their system of reheating exhaust steam and superheating live steam. A number of engravings are given, showing the details of their reheater and its application to existing plants, the whole forming a very interesting exposition of the subject.

The Hughes Steam Pump Company, of Cleveland, Ohio, have sent us a copy of their new catalogue, which will be known as No. 9, and is dated 1889. It is devoted to their various lines of steam pumps and gives illustrations, price lists, tables of dimensions and brief descriptions. In addition, short chapters are given containing directions for connecting and running pumps, miscellaneous paragraphs of general interest relating to pumping work, tables of areas of circles, loss of fluid pressure by friction, with different diameters of pipe nozzles, &c.

Messrs. Thos. Carlin's Sons, of Allegheny, Pa., have sent us a copy of their catalogue devoted to stationary, hoisting and winding engines, pile-driving machinery, boilers of various types, centrifugal pumps, grinding pans, &c. The catalogue is profusely illustrated, and the different designs are briefly described. Tables of sizes are also given.

The Chesapeake and Ohio Railroad is about to erect extensive shops and a round-house at Gladstone, near Lynchburg, Va., on the line of the Richmond and Alleghany Railroad. Employment will be given to about 500 men.

Among recent orders billed by the Revere Rubber Company, of Pittsburgh, may be mentioned a belt for the Westmoreland Paper Company, at West Newton, Pa., which was 48 inches wide, tenply thick, 110 feet long and weighed 1709 pounds. It is to be used for transmitting 750 horse-power.

The Montana Coal and Coke Company, on the Morgantown branch of the Baltimore and Ohio railroad, are erecting a new crusher and washer that is to cost \$40,000. The company have fired their full plant, consisting of 169 ovens. About 200 men are employed. It is said that a company has purchased 10,000 acres of coal land on the West Fork River, near the New England mine, and will at once commence the construction of 200 coke ovens. The company will also build a railroad from Fairmont to Clarksburg to intercept the Baltimore and Ohio at that place.

F. R. Phillips, 407 Walnut street, Philadelphia, reports November sales of Post's Zero metal to be the largest on record. The continued increasing demand and large repetition orders are pointed to as sufficient evidence of its quality for heavy pressure and high speed machinery.

The Columbian Iron Works and Dry Dock Company have under construction an iron frame, iron plated, side-wheel steamer, which is to be used as a harbor iceboat. Her dimensions are 210 feet in length, 34 feet beam and 14 feet depth of hold; she will have horizontal engine of 1200 horse-power, jet condenser, and large double end boiler to carry 60 pounds. The prow of the boat is so formed that, when breaking ice—which will be its principal occupation—the boat will ride upon and, by its weight, crush the ice. The cost will devolve jointly on the city and State.

Hardware.

The Universal Horseshoe Machine Company have erected their plant at Anniston, Ala., within a few rods of the bloomery between the tracks of the Georgia Pacific and the Atlanta and Anniston railroads. The building is 150 by nearly 100 feet. Anniston was selected that the company might use the blooms made by the bloom-

ery, which are referred to as especially adapted for horse and mule shoe purposes. The company intend making six different kinds and sizes of horseshoes and two different kinds and styles of mule shoes, which will possess features entirely different from any heretofore in use. The three-calked and four-calked are especially alluded to. These calked shoes are made by a machine lately patented, by which they are turned out at a rapid rate. In regard to the special features of these shoes the company advise us:

The calks are left in the bar and spaces of the material are rolled out between these calks. The rolls of the machine receive this bar of the required size as it comes from the train hot, and, passing through these grooved rolls to the necessary length, it is then cut off and bent into the horse or mule shoe shape. A clip is then put upon the toe of the shoe, and, after the nail-holes are punched, the shoe is complete, ready to nail on. The company are called Universal because they intend, and can make by this machine, any kind or style of horse or mule shoe required or designed, with or without calks or a continuous calk, or a plain flat shoe, or a shoe partly calked and other parts swedged up, &c.

It is the intention of the company to make from 15 to 25 tons of shoes per day. The 12-inch merchant train, together with engine and rolls, are being made by the Lewis Foundry and Machine Company, of Pittsburgh, Pa., and the horseshoe machines by the Delamater Iron Works, New York. The company have a capital of \$300,000, and, with their improved machinery, expect to furnish these different varieties of horse and mule shoes, made complete, at a lower price than the shoes now in use are put on the market. The present officers of the company are J. D. Billings, president; T. B. Everett, treasurer, and C. L. Suffern, secretary.

The Buhl Stamping Company, Detroit, Mich., are at present manufacturing brass and japanned bird cages, cheese factory can trimmings, railroad shipping can trimmings and the Buhl safety lock tubular lanterns.

We are informed that the report that the Leng Wire Nail Company, of Belleville, Ill., would shortly increase the number of nail machines in their factory and also increase their capital stock is without foundation. The company at present are operating 14 machines.

E. C. Atkinson & Co., saw manufacturers, of Indianapolis, Ind., are about to place upon the market the largest saw, as they claim, ever made in this country. It is to be 88 inches in diameter and No. 12 gauge, the rim being about 8 inches in diameter; will admit sawing 40-inch lumber without the necessity of double saws. During the past year this company have invested about \$50,000 in a plant for the manufacture of band saws.

The Tubular Wagon-Wheel Mfg. Company, recently chartered at Pittsburgh, with a capital stock of \$200,000, are seeking a location for a factory in the vicinity of McKeesport, Pa. No definite arrangements have yet been made as to the new plant.

The factory of the Mallory & Wheeler Company, lock manufacturers, New Haven, Conn., after a shut down of two weeks, has resumed operations. The factory will run three days a week until further notice.

The Canadian Government has granted the Canadian Pacific Railway Company the power to bridge the St. Lawrence River at Coteau. This will complete a thorough line to Boston and New York from Ottawa. The total length of the bridge, including abutments, will be 405 feet. The Central Missouri Railroad will commence work on its bridge at Alton in January.

The Iron Age

New York, Thursday, December 13, 1888.

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GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Beam Combination.

Some very erroneous statements have been allowed to go unchallenged in the recent debate in the Senate on the duty on iron and steel beams, by both friend and foe. The most serious of these errors is that the producing capacity of this country has been insufficient to meet the largely increased demand; that as a result thereof beam manufacturers are indifferent sellers; that, in fact, they were unwilling to enlarge their production, preferring to manufacture a limited supply at an enormous profit. As a matter of fact, the producing capacity of the country has steadily increased. During the past few years the Homestead Mill has developed a very large output; Jones & Laughlins entered the ranks, both of them for a time remaining outside of the combination. At this writing the new Columbia mill is underselling the combination, and the North Chicago Rolling Mill Company have been gradually working their way into the beam business. At least two Eastern mills, long in the trade, are contemplating, or have under way, the erection of additional machinery. We need only add that two mills alone have been actually producing 40 per cent. of the entire quantity of beams made in the country, mills which are by no means much greater than the other six in the combination. The charge that an artificial scarcity is fostered for the sake of wringing extortionate profits from consumers is therefore absurd. It is not denied that the manufacture of beams has been fairly profitable. It has been the one branch of the trade in which brief seasons of exceptional prosperity have not been followed by protracted periods of depression and ruin. Prices have been uniform for long spaces of time. They have been sufficiently remunerative to encourage American manufacturers to be progressive far beyond anything which their European rivals have attempted. In finish, excellence of workmanship and high quality of material American beams, with a few rare exceptions, have led the world. The standard of quality has been so high that prudent builders and bridge engineers have given very little encouragement to importers, although the prices of foreign beams have been generally \$10 to \$12 per net ton lower. In structures upon the integrity of which the lives of many people are dependent absolute safety is purchased cheaply at the price demanded by manufacturers of a good article. American beam-makers can look back with pride upon their record in this respect. They have deserved the prosperity they have enjoyed, and can face the public with confidence. They have kept abreast in progress, and are leading in the important changes which are going on in the direction of substituting steel for iron. On

the whole, it has been done conservatively, without the dangers which would have accompanied wild competition.

In 1876 beams were selling at 6½ cents to 7 cents, according to size, and ¼ cent was charged for punching holes. To-day the price is about one-half, 3.3 cents per pound, with ⅞ cent added for punching. The lowest price which they ever reached was 2½ cents per pound, during one of the periods of the disruption of the combination, which have occurred at frequent intervals. In fact, the present association is the one which has enjoyed the longest life, having been formed in 1885, and even it was critically near a break at one time. The price, too, is only apparently high, as any one connected with the iron trade will appreciate when we state that it abolishes size extras entirely, and that it means free delivery. The combination price is the same for all sizes of beams, large or small. In every other department of the manufactured iron trade certain standard sizes constitute the base price, and extras are charged for odd or unusual sizes, difficult to roll, or called for only in small quantities. These extras often double the base price. The price of beams is placed to represent the average, so that in reality the purchaser of extra sizes is getting very much the better of his bargain. The expediency of such a system may be a matter for considerable discussion, into which we do not propose to enter now, but we do insist upon pointing out the fact that it gives the average price an appearance of an unduly high level. Then, the highest combination price is 3.3¢ to 3.4¢, delivered at any point east of the Mississippi River. This, again, causes it to seem high, when in reality, the mills net considerably less, the freight in some cases being as high as ½ cent a pound.

There is another charge against which a protest should be entered. A good many in the iron trade, and a far greater number outside of it, have the most exaggerated notions concerning the profits in beam manufacture. It has tempted a few into the business, who have dearly bought the experience that the rolling of beams cannot be learned in a day, that it involves large amounts of capital to carry stock, that the labor accounts are heavy and that the waste, through cutting to lengths required, is very large. It has become a favorite argument of those who are catching at popular favor by crying down the beam combination to draw parallels between steel rail making and beam manufacture. With a fine show of liberality, they generally add a few dollars a ton to a mythical estimate of cost of rails and proceed to figure out the exorbitant profits of the beam monopolist. We need only state in reply to these arguments that the same train of rolls will turn out, with the same number of men, at least five times the tonnage on rails of standard section, which it can produce of beams of average size, taking the orders for the latter as they come.

We are convinced that unbridled competition in the manufacture of beams would be a public misfortune, since it could only too quickly tend to introduce that element of false economy in the choice of raw materials and in the methods of manufacture which follows a wild struggle for existence.

Prison Convict Labor.

Mischievous labor agitators, through the operation of what is known as "the Yates law," passed by the Legislature of New York at their instigation about four months ago, have utterly paralyzed the prison labor system of this State. This law supersedes both the "contract" and "State account" systems, throwing into disuse a valuable and expensive plant of special machinery, and at the same time restricting the sale of the products of prison labor simply to the supply of the needs of public institutions. Thus 6000 convicts are plunged into idleness, with the most pernicious effects, physically and morally, and burdening the taxpayer as never before. Instead of yielding a net revenue, the costs to the State are not less than \$400,000 for the current year and for the year to come, according to intelligent estimates, these figures will be increased to \$1,000,000. All eyes are turned to the Legislature in hopes of relief. It is well understood that the State account plan was abolished and the Yates bill passed because labor organizations complained that prison-made goods competed with honest labor and wages were affected. By the use of machinery large quantities of manufactured goods were crowded on the market. In Sing Sing Prison, for example, 433 men were employed in the stove works, and as recently as last August were turning out 200 stoves a day. The Yates bill, however, abolished motive-power machinery, and in addition confined the labor of men to the narrow sphere of making only such articles as are required in our penal institutions. The labor of a few score of convicts now suffices, where under previous conditions thousands were profitably employed.

There are grave reasons for doubting the expediency of employing machinery to any general extent as a substitute for manual labor in prison management. On this point the testimony of Richard Vaux, ex-Mayor of Philadelphia, and for many years past president of the Board of Inspectors of the State Penitentiary for the Eastern District of Pennsylvania, is highly suggestive and worthy of serious attention. Mr. Vaux says: "Every convict should work, but he should not for prison profit, or with machinery, or for the payment of interest on the cost of it, nor interest on the cost of the prison plant, be worked with machinery to pay the debt account of prison expenses and call that punishment. He should be taught a trade and the use of tools; be hand-trained and head-trained, so that he can be self-supporting when he gets out of prison. He must be taught individually. If he has been employed with a gang of fellow convicts working steam-run machinery he gains no knowledge that will be useful to him when released. He has been taught only a small portion of manufacturing and what does that benefit him? His time has been wasted. He ought to be self-dependent when he leaves prison, for the chances are against him in seeking employment in a private factory like the one he worked for in prison, because he would have to give the State Prison for reference when he applied for work." It is claimed that there is no similar institution in the country better managed than the peniten-

tiary of Eastern Pennsylvania. The general plan there adopted stated in brief is to teach the whole mode of making anything that can be made by one person, so that the discharged convict may be qualified to obtain a subsistence through honest industry. The experience of the New York State reformatory at Elmira forcibly tends to corroborate these views. Fortunately for the usefulness of this institution, although Attorney-General Tabor decided that under the Yates bill all shops must be closed, the trade schools, at which hundreds of young men are being taught, may remain undisturbed so long as nothing is made in them to sell in the open market. In this reformatory are classes which receive instruction in machinery, blacksmithing, plumbing, &c., so that every man when released has command of a useful trade. It is now proposed to introduce into the New York Legislature at the coming session a bill recognizing some of the most valuable features of the Elmira Reformatory, with the object of converting Auburn or Sing Sing prison into a similar institution, while others, like Dannemora, are reserved for more depraved offenders, with the State account plan practically restored. As explained by Mr. Round, of the Prison Association, who is one of the committee charged with the preparation of the bill, one object is to make the prisons as nearly self-supporting as possible. "A limited number of men should be employed in each prison in the larger industries in the smallest possible ratio to those working in the same industry outside. The ratio should not exceed a certain per cent. That would reduce competition to the lowest possible point. Really there is no competition, for if the prisoners earn anything, the expense of keeping them is reduced just that much. It costs the State at least \$100 to support a criminal in idleness in jail for a year. When he is turned out without a trade and no means of support, it costs the State just \$3500 a year to keep him out of prison. That is based on the estimate of what it costs the State to take care of its criminal class. All that amount has to be raised by taxation, and if taxes are high wages are low and rent and supplies are high. Does the laboring man, who is in favor of keeping the prisoner in idleness, ever think of that? Now, if the criminal had work in prison, his cost would be practically nothing in jail, and he would become self-supporting when out, providing the trades unions let him earn his living at a trade learned in prison."

It is generally admitted that the wretched slough into which the prison system of this State is plunged by the Yates bill is intolerable. A four months' trial of the experiment is sufficient to condemn it, excepting so far as experience may demonstrate the wisdom of restricting the employment of machinery within certain prescribed limits. One thing is certain, that the common sense of the people revolts against any system that takes our convicts from profitable work and consigns them to indolence, while all productive labor of whatever kind is taxed for their support. From the standpoint of morality, stepping higher and beyond considerations that are merely pecuniary and politic, the condemnation is still more emphatic. The whole subject demands careful reconsideration at Albany.

Railroad Associations.

The interest taken by the people in the tariff discussion of the late election seems in some quarters to be almost equaled by the interest taken in the railroad problem. The difficulties of the situation have been dwelt upon in the daily papers, and various remedies suggested. There is one phase of the question, however, which has not received quite the attention it deserves, and that is the intimate commercial relationship between dull business in trade and in transportation. It is very clear that competition between railroads cannot be encouraged to the same extent as between rival business houses in any line of trade. Railroading is a business by itself, having its own economic laws. Bankruptcy will always prevent a too disastrous rivalry in commercial affairs, but not in transportation. This is the lesson of the present railroad troubles as expounded by the managers, and, no doubt, it has been learned; but on the other hand it would be equally bad to eliminate the commercial features from transportation. Railroads can find their highest usefulness to investors and to the mercantile public when their profits follow to some degree the scale of profits in the communities which they serve. Practically this is often done unconsciously, but under the present discussion it is well to state it more dogmatically. This truth is really the underlying cause of much of our so-called "rate-cutting." Men and newspapers frequently charge all lowering of rates to the vindictiveness or foolishness of railroad managers, but this is very unjust. Managers like other business men are controlled by commercial conditions. As well might we say that all manufacturers are foolish when any article falls in price. Take the case of wheat. The Pennsylvania reduced the rate from Chicago to New York, because the short crop and high price had well nigh stopped the export traffic; that road and the steamship lines it controls could not afford to shut off the carriage of breadstuffs, and hence reduced the rate to stimulate the movement. Every retailer who reduces the price on unsaleable goods acts on the same principle. We cannot expect in so complicated a matter as transportation to be able to trace every reduction in tariffs at once to this source, and undoubtedly some railroad wars have no such excuses. But plain business reasons, such as influence merchants the world over, can be given for a larger part of tariff breaking than is generally supposed. There comes a time to every railroad manager when traffic for his road at reduced rates or no traffic at all is the alternative. In such cases there is but one wise choice. Occasionally we have men wondering why railroad rates are steady when the volume of traffic is large, but weak when tonnage is light. Here is the simple and ample explanation: the laws of trade operating to make the business of transportation no more profitable than any other business.

At the present time the stock market represents the general state of trade as well as the condition of our railroads.

These facts should be borne in mind in any attempts to remedy our railroad troubles by legislation. The Interstate Commerce Commission in their report speak of

the need of regarding our railroad system as a whole and we think the public mind is more favorable to associations between carriers for this purpose than heretofore. But it does not follow that a legalized pool is necessary for this, and in so far as such a rigid system would be out of touch with the commercial conditions of trade it would not be best for itself or for the community. An association of railroads strong enough to protect itself against combinations of shippers—the dressed-beef men, for instance—and strong enough to insure a reasonable degree of steadiness and impartiality to shippers' rates of freight, such an association is to be welcomed; but this should not include power enough to force rates upon merchants and manufacturers without regard to changing commercial conditions.

A Needed Convenience in the Machine Trade.

Builders of special machinery may be excused for not informing their clients how to order duplicate parts in case of breakage. Those who make standard machines, however, would confer a very great favor on their patrons if they would, in addition to cuts of machines, publish in their catalogues sectional or skeleton views with the different parts numbered. Then, when a machine breaks down the operator can order by telegraph, if necessary, giving the number of the part broken. Hardly any two machines from different shops will agree upon the technical name of an inferior or subordinate part of a machine, although they may always correctly designate the main working parts. Shop phrases and special terms are current in one establishment which are a totally unknown language when used in speaking to a workman employed in another shop. The language is still more mystical to the operator on the machine, who may not be a practical machinist, but in every other respect a trained workman, thoroughly competent and perfectly equipped to perform his task on it. Take for instance, a steam hammer. The hammerman may be an expert in the use of the tool, but know very few of the technical names of the parts. If his hammer breaks down he is at a loss how to describe the portion broken, unless it is one of the main parts or he has been so long in his position that he has somehow picked up the terms employed. In his ignorance of the names used he would probably have to make a sketch of the broken part and send that by mail, or forward the pieces by express or freight and lose a great deal of very valuable time, which would be saved if he could order by number by telegraph. This is assuming that builders of machinery issue catalogues. All of them do not, however, it being a remarkable fact that some very important engineering establishments in this country consider a catalogue superfluous. When written to for a list of their standard machines they can only furnish photographs of a few, and make their customers work in the dark if they desire to order other sizes or patterns. The catalogue is an essential in the systematic dispatch of business, and next comes the sectional views with numbered parts as an important chapter in the table of contents.

The Copper Syndicate and the Manufacturers.

The report, so quickly contradicted, of the closing down of the Anaconda mine under an arrangement with the syndicate has again given rise to a good deal of discussion. The story seemed plausible, because it was well known that negotiations between the two parties were in progress. The Anaconda is the only large producer which had a contract for only one year. This contract is about to expire, and the power of the owner of the mine, and the capacity of the latter, put him into a position where he can drive a very hard bargain. It is probable that the report alluded to foreshadowed to some extent the arrangement which may ultimately be made, though it would reduce the profits of the syndicate on its American mines to a very small amount, if, indeed, it did not swallow them entirely.

Those in sympathy with the syndicate express the greatest confidence in its strength. They insist that the most trying time, due to the appearance in the markets of the world of supplies invisible before the advance, is over; that consumption of new copper is increasing rapidly; that production has reached a maximum, and that it is not even up to the engagements of the syndicate. In this country, it is said, the Calumet and Hecla, Tamarack, Boston and Montana, and other leading mines are behind their deliveries to the French ring. The reported accumulations of Anaconda matte in this port at Baltimore and at New Orleans are claimed to be due to the rise in freights and the scarcity of tonnage some time since; they are merely stopped in transit, and are not held back to make the statistical position in copper in the world look less serious than it really is.

So far as the American manufacturers are concerned the syndicate insists that they have been treated very leniently. Some of them, it is said, have taken advantage individually of the fact that the raw material has been supplied to them at a price considerably below the nominal market price. Copper sold at 16½ cents has been put at the syndicate at the exchange market quotation, but not without the knowledge of the syndicate, which has traced its origin, and has shown that it possessed that knowledge. Attention is drawn to the alleged fact that in reality American manufacturers are getting their copper at a lower price than those abroad, that casting brands are cheaper here to manufacturers than G. M. B brands are to English makers, that Lake copper is lower at 16½ cents here than it is abroad. Although the threat is not uttered, the possibility of putting our makers on the same basis with the Europeans is pointed out. The idea is scouted that the syndicate would, as a manufacturer, spoil the market of its customers for ingot copper in this country. While it is conceded that prices are very low in some branches of the trade here, when taking the cost of the metal into consideration, this being the case notably in brass, which is selling at 16½ cents a pound, it is insisted that in other departments the prices of manufactured goods are kept at figures which leave exorbitant margins. American manufacturers, it is urged, have only themselves to

blame if they invite competition in spite of the fact that they get their copper cheaper than European rivals.

It is stated that at present prices on both sides of the Atlantic there is a possibility that large contracts for copper wire rods could be placed here from abroad. If such a business were done it would create a great outcry among the manufacturers on the other side of the Atlantic, and might lead to an adjustment by the syndicate of prices to consumers both in Europe and here. In other words, the syndicate has dealt leniently with the manufacturers. It has winked at the practices of some who have made it take back at a higher price copper sold with the express understanding that it was to go into consumption. It has kept the price of copper lower to them than to others. It has the power, and may possibly exercise it, of placing European manufacturers on a basis much nearer to that at which competition is possible.

Such are briefly some of the views expressed by those who are in sympathy with those who claim to have restored the metal to its proper position in the markets. We need hardly add that our sympathies are not enlisted on that side. We believe, with the conservative element in the trade, that the intervention of the syndicate is a misfortune to great interests, and that every day added to the period of its tenure of power must aggregate the evils of an artificial condition of affairs. We are as firmly convinced of the ultimate fearful collapse of the gamble as its most virulent opponents, but we hold that present conditions must shape the course of every one in the trade, and they, we repeat, point unmistakably to a continuance of the sway of the syndicate for some time to come.

Bolivia's Revolution and the Silver Supply.

Since November 27 silver has again declined in the London market from 43d per ounce to 42½d, due to the absence of demand for India, on the one hand, and to dearer money in Europe generally, on the other. The advance in silver in the summer has gradually been lost, but the outlook seems to point to higher rather than lower rates in the future. Both Russia and Brazil, in view of contemplated financial reforms, will be buyers of silver to a notable amount ere long, while silver production is not likely to exceed last year's but may be less. Since 1860 the world's silver production was shaped as follows, reduced to tons of 1000 kg.:

	1860.	1865.	1870.	1875.	1880.	1885.
	Tons	Tons	Tons	Tons	Tons	Tons
United States..	7	174	301	585	981	1,137
Mexico.....	457	473	521	602	656	754
Bolivia, Chili, &c.....	205	191	230	375	350	430
Germany.....	55	68	89	143	164	23
Other countries	172	195	198	285	300	308
Total.....	866	1,101	1,339	1,970	2,451	2,962

A quarter of a century has sufficed to raise production in the New World from 669 tons to 2321, almost quadrupling it, while Europe and other countries about doubled theirs. Last year we produced \$53,357,000, against \$51,000,000 in 1886, and the stock held on July 1, 1888, was:

Silver dollars.....	\$299,708,790
Subsidiary silver coin.....	76,406,376
Silver bullion for coinage.....	3,950,388
Melted trade dollars.....	6,545,554
Silver.....	\$386,611,108
Gold coin and bullion aggregated.	705,818,855
Total metallic stock.....	\$1,092,429,963

This was distributed as follows:

United States Treasury.....	\$594,533,172
National banks.....	105,435,492
Other banks and circulation.....	392,461,299
Total.....	\$1,092,429,963

Even supposing that during the year now drawing to a close our production increases a couple of million dollars, nothing threatens silver from this country so long as the Bland bill remains unrepealed. As the next Congress is constituted there is, it must be confessed, little prospect that the bill will be repealed in a hurry. Mexican silver production is on the increase, but the latter is not likely to exceed \$5,000,000 per annum in any year, as silver mining and access by rail are for the moment in the neighboring republic, whereas in Bolivia, the third country in rank as a silver producer, we have to deal with a widespread revolution which hampers production and absolutely stops exportation. Bolivia turns out in a politically quiet year no less than \$20,000,000 of silver. Potosi produced from 1544 to 1572 \$250,000,000, from 1572 to 1627 \$340,000,000; it then fell off to \$3,000,000 per annum, but gradually recovered till 1809, when the war of independence put a stop to mining for 16 years, since when there has been a steady increase in the silver-lode districts. The Cerro Rico de Potosi from 1544 to 1887 has yielded a little over \$2,000,000,000 in silver. As a general thing during the past 15 years war and revolution have interfered comparatively little with mining operations in the silver districts of Bolivia, but frequently for a while with export, the roads being bad and the distance from the Pacific great. Miners pay no taxes, and the export duty is only 58 cents on about ½ pound American on silver, gold being free, and mining machinery entering duty free. Timber is scarce, and with it better fuel than *tuquia*—llama dung—and *vareta*—moss. But these disadvantages have been somewhat diminished, for by means of the Mallendo-Arequipa-Puno Railroad, connecting with steam navigation on Lake Titicaca and the stage roads from Chililaya or Puerto Perez to La Paz, and thence to Corocoxo and Cruro, an extensive mining region has been made easier of access, while the steady advance of the railroad system now extending westward in the Argentine Republic toward Southern Bolivia is greatly facilitating the reopening of the Potosi mining district, which has lately been undertaken by an Anglo-Bolivian Company. The Huanchaca mine produced in 1885 \$4,819,146 worth of silver ore, netting the company for the year \$2,080,000. Even during the war on the Pacific \$20,000,000 were invested in new mining enterprises, and all this money was raised in the country.

Since the revolution broke out in September last railroad communication between Mollando and Lake Titicaca has ceased, the transportation of goods and bullion on mules' backs likewise, mine owners and merchants not wishing to expose their property to being plundered in transit and mule drivers refusing to run the risk of their lives. Bolivia mining shares suffered a serious decline in Valparaiso, but by latest accounts recovered part of it. President Aniseto Noce, elected last summer, and his cabinet are wandering from place to place, after fleeing from the capital, Sucre, and muster-

ing forces to resist the rebellion led by Pacheco and Rivadeneira. So far as accounts go, decisive engagements have not yet occurred, though a good many lives were lost in a street fight in Sucre. How long the struggle may last in a mountainous country 1,139,250 square kilometres in extent is doubtful. While it does the silver supply will be restricted from that important source.

The Blast Furnaces on December 1.

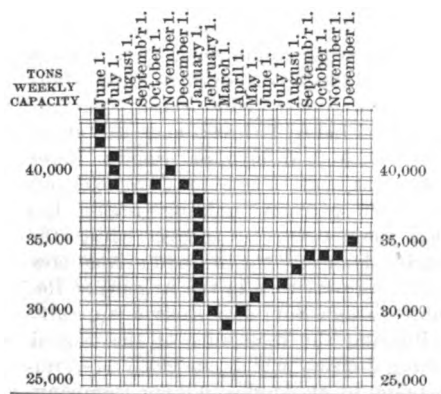
Again we can record a notable increase in the capacity of the blast furnaces at work, the principal advance being made in the coke plants. We accompany our report by diagrams, which show at a glance the general change for a period extending over a year in the case of the anthracite and the coke stacks. They convey a better impression than a brief study of the accurate figures reproduced in the summaries following the tables.

On the first of the month the condition of the anthracite furnaces was as follows:

Anthracite Furnaces December 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	24	10	3,264	14	4,095
New Jersey.....	10	4	1,492	6	2,992
Spiegel.....	3	3	230	0	0
Pennsylvania:					
Lehigh Valley....	44	26	9,672	18	5,600
Spiegel.....	1	1	60	0	0
Schuylkill Valley..	38	21	6,872	17	4,531
U. S. Susquehanna Valley.....	17	10	3,199	7	1,606
Lebanon Valley....	16	12	5,706	4	1,815
L. Susquehanna Valley.....	22	12	4,384	10	2,266
Total.....	185	99	34,879	76	22,705

Diagram of Anthracite Furnaces.



For a year past our records show the following:

	Furnaces in blast.	Capacity per week.
December 1.....	99	34,879
November 1.....	95	33,645
October 1.....	95	33,728
September 1.....	92	33,541
August 1.....	93	33,397
July 1.....	92	32,478
June 1.....	99	32,418
May 1.....	96	31,003
April 1.....	94	30,496
March 1.....	98	28,598
February 1.....	97	29,989
January 1.....	118	38,206
December 1, 1887.....	122	39,487
November 1.....	124	40,028
October 1.....	123	39,440
September 1.....	125	38,338
August 1.....	129	37,960
July 1.....	138	40,742

Among the anthracite furnaces the principal events are the blowing in of the Hudson, continued heavy work on the part of Musconetcong, in New Jersey, the resumption on the part of Mount Laurel, No. 2 Brooke, the fifth Crane and Lochiel furnace. Among those which are prepar-

ing to go in, or have already done so since the 1st inst., are Merion, Montgomery, Chester, Marshall and Lebanon Valley. During November Bethlehem and the Thomas Iron Company each blew out one furnace. The Lehigh spiegel furnace was idle, relining, during a part of the month.

The status of the coke furnaces was as follows:

Coke Furnaces December 1.

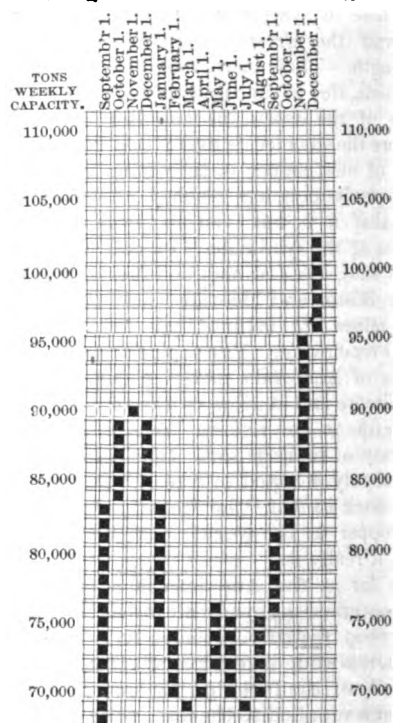
Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	3	1	1,017	2	1,850
Pennsylvania:					
Pittsburgh district.....	19	19	22,023	0	0
Spiegel.....	1	1	593	0	0
Shenango Valley..	19	15	11,065	4	2,045
Juniata and Conemaugh Valley.....	18	10	6,020	8	2,891
Spiegel.....	1	1	430	0	0
Youghiogheny.....	5	4	1,853	1	600
Miscellaneous.....	4	4	2,630	0	0
West Virginia.....	2	1	250	1	120
Ohio:					
West Virginia.....	6	4	2,604	2	360
Central and Northern.....	14	9	7,251	5	3,540
Hocking Valley....	18	13	9,171	5	3,602
Hanging Rock.....	14	7	1,798	7	1,720
Indiana.....	11	6	1,470	5	1,033
Illinois.....	2	2	383	0	0
Michigan.....	13	11	12,041	2	1,500
Wisconsin.....	1	0	0	1	250
Missouri.....	4	2	995	2	1,352
Colorado.....	6	1	584	5	2,130
The South:					
Virginia.....	1	1	465	0	0
Kentucky.....	11	8	3,294	3	2,117
Alabama.....	4	4	1,019	0	0
Tennessee.....	21	18	10,321	3	1,300
Georgia.....	11	10	4,645	1	450
Total.....	211	151	101,748	70	28,120

	No. of furnaces.	Capacity per week.
December 1, 1888.....	151	101,748
November 1.....	146	94,695
October 1.....	137	85,461
September 1.....	133	81,082
August 1.....	122	74,355
July 1.....	121	69,743
June 1.....	128	75,427
May 1.....	130	75,815
April 1.....	128	70,644
March 1.....	128	68,892
February 1.....	136	73,912
January 1.....	143	83,101
December 1, 1887.....	144	88,885
November 1.....	151	90,459
October 1.....	152	89,123

In New York, a second Troy furnace is about to go in on foundry iron. In Pittsburgh, for the first time, every furnace is in blast, the new Soho having gone in on the 15th ult. Two more furnaces are in course of construction, one by Laughlins & Co., and the other by the Carrie Company; with them the capacity will be little over 25,000 tons a week. In the Shenango Valley Spearman started in during November, and the second Stewart has since been blown in. The returns from nearly every furnace show a November product of 46,352 tons, against 46,530 tons in October, so that practically the district is close to its maximum capacity of 50,000 tons, taking into account that one or the other furnace is always likely to be out for repairs. There are no changes to note in the Juniata and Conemaugh Valleys, or on the Youghiogheny, the total product of the latter having been 7084 tons. To the furnaces grouped under miscellaneous has been added the new Cameron furnace at Emporia. Center is running, and so is Bellefonte, which, however, lost a week in making repairs. So far as West Virginia is concerned, we may note a particularly heavy product for the Riverside. In the Mahoning Valley Grace stopped on the 24th ult., and Himrod suffered from an accident, the product of the district falling off from 38,649 tons in October to 35,809 tons in November. Among the furnaces grouped under "Central and Northern Ohio," we may note the blowing in of No. 1 Cherry Valley on the 15th ult. This is, however, more than coun-

terbalanced by the stoppage of one of the furnaces of the Cleveland Rolling Mill Company, and the blowing out of Jefferson. The November product was only 40,810 tons as compared with 42,862 tons in October, and December is likely to show only 38,000 tons. In the Hocking Valley Akron went in and Gore, which has put in a new hearth and inwall, is probably at work again at this writing. In the Hanging Rock region the new Blanche blew in since the 1st of this month. In Illinois Calumet was lighted on the 29th ult., leaving only one Chicago and the smallest of the Union stacks idle. The November output was 43,957 tons, against 47,503 tons in October. In the South the principal event has been the blowing in of the third Ensley furnace, on the 29th ult., and the resumption of the third South Pittsburgh, which will bring the product of the Tennessee Coal, Iron and Railroad Company to over 20,000 tons a month and give it the lead of all the producers of foundry and mill irons. A few of the great steel companies only are

Diagram of Coke Furnaces.



producing more pig iron, though, of course, only for their own use. When the fourth furnace at Ensley is completed it will probably at times reach 25,000 tons a month. The second Woodward has gone in; the second De Bardeleben was not yet in blast, however. We estimate the November output of Alabama at 37,120 tons, which may be increased to close to 45,000 tons in December if all the plants do well. Tennessee and Georgia ought to add to it 23,000 tons. The Virginia furnaces made in November 13,970 tons; Lynchburg having blown in on the 8th, and Pulaski having run during all the month with only one engine, the other being under repairs. The furnaces ought therefore to come up to 15,000 tons in December. Kentucky turned out 4369 tons in November. Taking the furnaces grouped together as the Southern, nearly all of which work for the open market on foundry and mill iron, and we reach a probable December output of 87,500 tons. This is at the rate of over 1,000,000 gross tons annually. Now there are under construction and partly completed, to go into blast during the winter, 11 furnaces in Alabama, not counting plants on which work has recently begun. Taking the average of the furnaces blown in during the last two

years, 2800 tons a month is a very liberal allowance for them. In the spring of 1889, we may, therefore, arrive at a total product of between 110,000 and 120,000 tons monthly, providing the fuel supply is adequate. By way of comparison we may state that in December, 1887, Alabama produced 18,084 gross tons; Tennessee, 17,621 tons; Georgia, 3428 tons; Virginia, 13,448 tons and Kentucky 1620 tons, a total of 54,201 tons. The great increase has, of course, taken place in Alabama.

The production of charcoal iron has fallen off slightly, the details being given below:

Charcoal Furnaces December 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	8	605	6	495
New York.....	23	14	511	9	400
Pennsylvania.....	10	8	450	2	624
Maryland.....	33	22	282	11	300
Virginia.....	3	3	258	0	690
West Virginia.....	0	0	0	0	165
Ohio.....	18	10	426	8	829
Kentucky.....	2	1	308	0	0
North Carolina.....	2	1	90	0	80
Tennessee.....	1	0	1,368	0	740
Georgia.....	2	0	90	0	114
Alabama.....	25	11	1,752	14	80
Michigan.....	10	9	3,332	1	3,280
Minnesota.....	1	0	0	1	190
Missouri.....	4	1	611	3	320
Wisconsin.....	10	4	1,447	6	810
Texas.....	2	2	315	0	0
California.....	1	0	0	1	220
Washington Ter.....	1	1	270	0	0
Oregon.....	1	1	330	0	0
Total Dec. 1.....	160	71	12,286	98	9,397
Total Nov. 1.....	169	73	12,724	96	8,941
Total Oct. 1.....	175	71	11,619	104	9,083
Total Sept. 1.....	176	67	11,243	109	10,004
Total Aug. 1.....	176	65	11,137	111	10,065

In Maryland Muirkirk has been completely rebuilt since the fire, the plant having been modernized. It has probably blown in at this writing. In Virginia Beverly, Cave Hill, Cedar Run, Foster's Falls, Reed Island and Speedwell are running. In Ohio Jefferson produced only a few days in November. It will resume during the current month. In Michigan Eureka stopped on the 14th ult. but has again blown in. Fayette went out until the spring, and Pine Lake also blew out on the 20th ult. for the winter. Peninsular, too, is idle, thus reducing the output of Michigan charcoal pig considerably. In Wisconsin Hinkle is doing large work, and Minneapolis closed the first year of its present blast on the 5th inst., with a very large total product. In Missouri Midland lost two days as the result of an accident to the hoist, and Sligo was idle from the 13th to the 24th for repairs. In the South no notable changes have taken place. The second new Nashville had not blown in on the first, the first being still run on coke.

Among their late sales the Ball Electric Light Company, of New York City, report the following: Wilmington City Electric Company, Wilmington, Del., an increase of 75 arc lights; American Electric Light Company, of Kansas City, Mo., an increase of 75 arc lights. Each of these companies before purchased of them a K., 75-light, 2000 candle power arc dynamo complete, an increase as above with a second dynamo of the same size. This dynamo appears to be attracting special attention for street and commercial lighting. Like all other dynamos of their system it has required no foundation whatever, but is simply fastened lightly with wooden blocks to the floor. In addition to these the company report the following sales: Phoenix Woolen Company, East Greenwich, R. I.; Stoughton Lighting Company, Stoughton, Mass.; Kirksville Light, Heat, Power and Water Company, Kirksville, Mo.; Stetson & Post Milling

Company, Seattle, W. T.; Edison Electric Illuminating Company, of Hazleton, Pa.; C. S. Bradford, West Chester, Pa.; Newport Light Company, Newport, Ky.; Walworth Steam and Power Company, Boston, Mass.; West Coast Electric Light and Construction Company, San Francisco, Cal., or a total of about 600 arc lights.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., December 11, 1888.

The summary bursting of the big Bessemer-steel gun and the explosion of the great expectations of its projectors have been the events of the week in ordnance circles. The superintendent, Mr. Hainsworth, and the officers of the casting company are somewhat emphatic in their efforts to shift the responsibility of the explosion to the interference of the Government officials with the tempering of the casting. The officers, however, reply to this by saying that the only work done upon it by them was the rifling, placing of the breechpin and testing the castings. The tests, they say, did not come up to the contract specifications and the gun might have been thrown out entirely. There had been so much talk about the steel cast gun that they waived this point so as to allow the gun to receive a trial and vindicate or explode the theoretic claims of the champions of steel cast guns.

The explosion of the gun on the first firing test has sent that style of gun down below par most effectually, but the experiment has been a real service, as it will be likely to shut off the incessant agitation of all sorts of schemes by unscientific men and non-experts. Senator Gorman, who has been the champion of the private competition theory of securing improved styles of ordnance, is not at all discouraged and believes in going ahead in the same line.

General Benet, Chief of Ordnance, said to the representative of *The Iron Age* today: "I was not in the least surprised at the result. No reliance can be placed on simple castings to resist the enormous strain to which modern guns are subject. The outer surfaces may look all right, but it is impossible to tell the condition of the metal within. The air bubbles and other causes of weakness, cannot be overcome except by forging."

"The failure of the gun to stand a test of 16 tons to the square inch was only a minimum showing. The strain is oftener 18 tons, and, sometimes, in cases of obstructions caused by the projectile adhering or being retarded in the bore, it runs as high as 100,000 pounds to the square inch. A Bessemer steel casting, without forging and the application of other strengthening methods, would be a very unsafe gun, either for defensive use or on board ships."

"The test of the Bessemer gun will, doubtless, put an end to that idea, as the lack of confidence in the strength of such a piece of ordnance would be very demoralizing to the men expected to work it."

General Benet said further that increased interest would now be given to the open-hearth cast-steel gun. He expects it to show greater resistance to the enormous strain, but as to the practical use of that style of gun he does not express much confidence.

Commodore Sicard, Chief of the Bureau of Ordnance, speaking of the burst gun, said: "Our calculations to determine the power of the gun did not indicate that it would stand the test. It looked well enough. In fact, was a superb piece of metal and a great credit to the skill of the workmen, but the boring showed numerous little air spaces which were calculated to weaken the gun."

"The bursting was inevitable. It was not strong enough to resist the service charge. Built up guns, with rings of steel shrunk by heat around the core, alone can resist the pressure; a simple cast steel gun cannot resist the pressure, and no thickness capable of being handled by even mechanical appliances for practical use would enable them to stand."

The universal testimony of other officers is to the same effect. The statements of manufacturers of steel castings, who are authorities on the subject, agree that unless some new methods of treatment are discovered cast-steel guns will not be the guns of the future.

An elaborate report, with photographs, is being prepared by the officers in charge for the information of the Department. The officers of the line of the navy say that the Government could not expect either officers or men to stand by guns in action which would be liable to explosion at every discharge. Had not precautions been taken against accident in this instance there would have been serious results from the firing test of the cast-steel gun. Fortunately there were no disasters except to the gun. The Senate has been giving tariff hearings during the week on various industries. The tin-plate interests were heard, Messrs. Swank and Jarrett arguing in favor of a protective duty of 2 to 2½ cents a pound. The argument was an unnecessary consumption of the time of the committee, who courteously listened, however, as there was an agreement among them before the adjournment to incorporate an amendment into the bill in the Senate placing that duty on tin plate. This is one of the certain things that the committee does favor, and therefore the subject requires no further agitation. The reduction of the duty on tin plate was an inexcusable movement in the interests of foreign manufacturers which the committee will remedy. The wire interest is to be heard to-morrow, Wednesday.

The debate on the tariff bill in the Senate was attended with some surprises during the past week. The display of a lower duty tendency among certain Western Republicans indicates some uncertainty in that quarter. Senator Plumb was disposed to attack certain features of the tariff schedules. The letters and telegrams received by the committee for hearings are coming in daily, and in numbers which would run the committee into the summer.

Senator Allison is pushing the bill in the Senate with the utmost energy. He is still in expectation of securing the passage of the bill—it not before the holidays very soon after.

It is reported that the Coke Consumers' Association, which is composed of the furnace operators of the Shenango, Mahoning and Ohio valleys, will protest against an advance in the price of coke at the opening of the year. Mill iron is selling at \$16, and at this figure they claim that they can stand no advance in coke. On December 1 they gave their employees a 10 per cent. advance and ore has gone up 50 to 75 cents, which increases the cost of making a ton of pig iron from \$1 to \$1.50. If coke went up to \$1.50 it would increase this from 30 to 40 cents.

Joseph J. B. Frey, manager of the Martin Iron Works, of this city, was killed on Tuesday while returning home from a visit to a relative in Elizabeth, N. J. Mr. Frey's body was picked up on the Newark Bay bridge of the Jersey Central Railroad, and it is supposed he was accidentally thrown off the train.

Eight fires on cotton-laden vessels have already occurred this season, but the origin of these fires is as much of a mystery as ever.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington street, CHICAGO, December 10, 1888.

In some respects the past week has been much more satisfactory than its immediate predecessors. As foreshadowed in previous reports, decided activity has suddenly become the feature of the trade in several lines, notably in Steel Nails, the increased demand being accompanied by higher prices. Even in the branches of business now experiencing dullness there appears to be no lack of confidence, and sellers manifest no uneasiness as to the future, believing that the generally healthy condition of business throughout the country will stimulate trade toward the close of the year, or, at furthest, early in January. More orders for cars are coming forward, and, although they are not so large as car-builders would like to see them, they are sufficiently numerous to impart a feeling of strength to the interests directly affected. The railroads are beginning to feel the effects of the enormous crop of corn, and their increasing earnings promise to furnish an important factor in the prosperity of the country in the coming year.

Pig Iron.—The demand for Strong Coke Foundry Iron continues to be the only feature of the market worthy of special notice. Good sales are being made of that class of Iron at very close to full prices. The lower grades are particularly firm, owing to the scarcity and high price of competing grades of Southern Iron. Very little movement is reported in Charcoal, Soft Coke or Southern Coke Irons. Charcoal is very stiff, with the inquiry principally for high numbers from the Car-Wheel manufacturers. As the time of the year is approaching in which season contracts are placed for this class of material the manufacturers are less inclined than ever to make concessions or to vigorously push sales. Reports are current of Southern Coke Foundry at concessions from regular quotations, but the lower grades are as firmly held as was reported last week. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1 and 2, \$20; Nos. 3 to 6, \$20.50 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, \$18.60; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Black-band), No. 1, \$19.50 @ \$20.50; other Ohio Soft Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$18 @ \$18.50; No. 2, \$17 @ \$17.50; No. 3, \$16 @ \$16.50; Coke Bessemer, \$17.50 @ \$18; Southern Coke, No. 1 Foundry, \$17.25; No. 2 Foundry and No. 1 Soft, \$16.75; No. 3 Foundry and No. 2 Soft, \$16.25 @ \$16.50; Gray Forge, \$16.

Bar Iron.—Orders for Bar Iron were placed during the week at 1.72½¢ @ 1.75¢, flat, Chicago, and further orders of the same character are in the market. The situation is unchanged as to prices, ordinary specifications for Common Iron ranging from 1.72½¢ to 1.75¢, half extras, Chicago. Some good orders for Splice Bars have been taken at about 1.85¢, Chicago, and other lots are now under negotiation. Small lots of Common Bars are still selling at 1.90¢ @ 2¢ from store.

Structural Iron.—The most important order placed during the week was the contract for 1200 to 1500 tons of Steel Beams and Girders for the reconstructed Chamber of Commerce Building, which was secured by Jones & Laughlins, and is described in greater detail elsewhere. The contract for building a mile of elevated railway in the city, on the so-called "Alley" route, will

probably be let this week. Mill lots are quoted as follows, f.o.b. Chicago: Angles, 2.15¢; Universal Plates, 2.20¢ @ 2.25¢; Tees, 2.55¢ @ 2.60¢; Beams and Channels, 3.40¢. Small lots from store command the following rates: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—A fair movement is reported in small lots of Plates, but orders for large lots have been lacking. Good orders are in sight, but they are slow to materialize. Quotations from store are firmly maintained as follows: Heavy Sheets, Nos. 10 to 14, 2.60¢ @ 2.70¢; Tank Iron, 2.55¢ @ 2.65¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron, 4.25¢; Flange Steel, 3.75¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢. Boiler Tubes, 60 % off.

Sheet Iron.—No change worthy of note has occurred in either Black or Galvanized, the demand continuing as active as at any time during the fall, except for Stove Pipe and similar common grades, for which the season is about over. Small lots of Black are quoted at 3.10¢ for No. 24; 3.20¢ for Nos. 25 and 26, and 3.30¢ for No. 27, and of Galvanized at 60 % and 5 % off for Juniata and 60 % and 10 % off for Charcoal.

Merchant Steel.—General business in this line has now been very quiet for two or three weeks, with but little prospect of an early change. Bessemer Bars have been sold at 2¢ from store. Other stock prices are as follows: Tool Steel, 8.50¢ @ 9.50¢; Specials, 13¢ @ 25¢; Crucible Spring, 3.75¢; Open-Hearth Spring, 2.50¢; Open-Hearth Machinery, 2.40¢ @ 2.75¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—An increasing inquiry from leading Western roads is imparting a better tone to this branch of trade, and is causing the local manufacturers to take a more cheerful view of the situation. Some heavy contracts are pending, and if contemplated extensions in the Northwest are actually undertaken other heavy purchases will be made. New schemes are coming forward also, but the prospects of business for the Steel Rail mills in that direction are necessarily remote. Prices will be more firmly held in this market hereafter, as Eastern competition is now practically ended by either the filling up of mills or their withdrawal from the Rail trade, and the local companies have about completed an arrangement for the amicable division of business. They still name \$30 as the basis of negotiations.

Old Rails and Wheels.—Consumers of Old Iron Rails are unable to supply themselves at lower rates than those recently quoted. For a lot of 500 tons picked up in the interior of the State, the buyers were obliged to pay \$23. This is equivalent to about \$22 at Chicago, but at that price no Rails can be had here, holders asking \$23.50. Judging from reports received here, the supply seems to be larger at points further east. Old Car-Wheels are at a standstill. Parties are trying to buy a few hundred tons, for which they offer \$19.25, but holders ask \$19.50.

Scrap.—The outlook is considerably better. Carload orders for Wrought are fairly brisk, sales of No. 1 having been made at \$21. Large blocks of Railroad Scrap have been offered, and from \$21.50 to \$21.75 has been realized for No. 1 Wrought, and \$20.75 for Track. City dealers are firmer in their views. Mixed Country Scrap is unchanged at \$14 @ \$15. Dealers' prices for carefully selected Scrap are as follows, per ton of 2000 lb: No. 1 Forge, or Railroad Shop, \$21 @ \$21.75; Truck Scrap, \$20.75; Fishplates, \$22; Horseshoes, \$20; Axles, \$26; No. 1 Mill, \$16; Pipes and Tank, \$13.50;

Light Wrought, \$10; Cast Machinery, \$13.50 @ \$14; Stove Plate, \$11.50; Cast Borings, \$9 @ \$9.50; Wrought Turnings, \$11; Axle Turnings, \$13.50 @ \$14; Coil and Leaf Steel, \$17; Locomotive Tires, \$16.

Hardware.—Jobbers of Shelf Hardware are busier than ever, an immense trade now being conducted. The demand is heavier than it was last year at this time, although it was then far ahead of any previous year. The assortment of goods called for is general in its character, but Staple goods are now moving much more freely than they have been of late. This rush of business will hardly continue very long, however, as the jobbers will soon begin to call in their traveling salesmen to get matters in readiness to take account of stock. Collections are very good. In Heavy Hardware a fair business is reported, but no unusual activity prevails.

Nails.—In Steel Nails the situation has been radically changed since our last report. Manufacturers' agents have taken large orders, and the price has been advanced by most of the factories 12½¢ per keg. The bottom price for large lots now seems to be \$1.87½, Chicago. The jobbers are having a heavy demand from all parts of the West and Northwest, and some of them have taken more carload orders in the past week than for months. To check sales and prevent stocks in retailers' hands from reaching too large proportions, they are advancing prices. For small lots from store \$2 is now asked, and \$1.95 for carload lots on track, but these prices are not expected to hold good more than a few days. The belief is quite general that Steel Nails will be considerably higher before the advance is checked. Small lots of Wire Nails are quoted at \$2.55 @ \$2.60.

Barb Wire.—The demand is growing, and this branch of trade is gradually working into better shape, but the large manufacturers are still making more Barb Wire than they are selling. They anticipate a heavy demand, which may come as suddenly as the demand for Nails sprung up, and when it comes they will be well prepared to meet it with full warehouses. Prices are a little stiffer, but there is no quotable change, small lots of Painted selling at 2.90¢ and Galvanized at 3.60 @ 3.65¢.

Pig Lead.—While very little actual business has been transacted, prices have advanced in sympathy with the upward movement in other markets, and at the close of the week 3.55¢ was bid and 3.60¢ asked.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., December 11, 1888.

Pig Iron.—The market has been very quiet during the past week, and in spots some little weakness has been developed. Taking the market as a whole, however, the feeling may be considered steady to firm, notwithstanding dullness and occasional symptoms of weakness, as already mentioned. Really good brands are held with absolute firmness, while other descriptions are irregular, and in some cases might possibly be had at comparatively low figures if firm offers were made for good sized lots. The trouble is that the brands wanted are so far sold ahead that makers are not desirous of increasing their lines at present quotations, while those that can be had are not such as buyers care to have, unless at a wide disparity in prices. The consequence is that the feeling is firm in one direction, but weak and uncertain in another, so that the trade hardly know what to think of the position. Two or three weeks more of dull-

ness would probably start a decline, but on the present basis of cost it could not be of much importance. On the other hand, a moderately active demand would be likely to absorb all the low-priced lots and place the market in a very firm position for the first quarter of the incoming year. Under these circumstances, there is a degree of hesitancy somewhat unusual, considering the low price of Iron, the high cost of Ores, &c. Moreover, stocks of Iron are light in comparison with the large consumption, and it would not require much increase in the demand, nor much of a falling off in production, to cause quite a scarcity of desirable qualities of Iron. The immediate conditions, however, are not such as to encourage hopes of higher prices, neither are they so discouraging as to warrant expectations of a decline, so that for reasons already given leading makers are no more anxious to sell than consumers are to buy, until some definite idea can be formed as to the volume of business likely to be forthcoming during the early portion of the coming year. On this point there are not sufficient data to warrant very confident predictions, although the general idea is that 1889 will be a year of great activity; the uncertainty is more in regard to the near future than to the ultimate result. This uncertainty curtails business for the present, neither side being willing to make the first move. Prices, therefore, remain same as last week, say \$16 @ \$16.50, at tide, for Gray Forge; \$17 @ \$17.50 for No. 2 Foundry, and \$18 @ \$19 for No. 1. A little beyond the outside figure for choice brands, but nothing of standard quality below the inside quotation.

Blooms.—No change in prices, demand fair at about the following quotations, according to analysis, &c., say—Steel Nail Slabs, \$28.50 @ \$29, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 $\frac{1}{2}$ "bloom" ton of 2464 lb.

Muck Bars.—The demand is lighter than for weeks past and prices are easier all around. Holders ask from \$29, at mill, to \$29.50, delivered, but buyers show no disposition to take hold at present, unless in small lots for immediate use.

Bar Iron.—The market is quiet and irregular, with no chance of getting business unless at low prices. This, of course, may be only temporary, but, in the meantime, if one mill refuses an order because of the low price the chances are that others will take it sooner than miss the opportunity of work to start the new year with. Consequently 1.75¢ @ 1.8¢ are the usual quotations on lots of 100 tons and upward, although nominal rates are 1.85¢ @ 1.90¢ for Best Refined Iron. As a rule, a fair amount of business of this kind has been secured, so that if the demand should pick up again it might not be a matter of much difficulty to stiffen prices to 1.80¢ or 1.85¢ as a minimum. Skelp Iron is quiet, with sellers at from 1.9¢ to 1.95, but there is no demand of any amount, so that quotations are merely the asking prices.

Plate and Tank Iron.—The feeling is a little weaker in this department, sales of Plates having been made to shipbuilders at very low prices. There is an impression, however, that the weakness will not be of long duration, as a great deal of work is in sight for the new year. Meanwhile, some of the mills are still anxious for business, and, to secure orders for round lots, prices would be shaded a trifle for desirable deliveries. Quotations are irregular, but nominally as follows: Ordinary Plate and Tank Iron, 2¢ @ 2.10¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and

Ship Plate, 2.25¢ @ 2.3¢; Shell, 2.7¢; Flange, 3¢ @ 3.4¢; Fire-Box, 3.4¢ @ 4.4¢.

Structural Iron.—Business is very quiet, orders for large lots being unusually scarce. The dullness is not likely to be very protracted, however, although orders could be placed to good advantage if they were promptly offered. There is the usual talk of large operations to be undertaken at an early date, but there is more or less uncertainty on this point; hence, increasing weakness in prices, which are nominally as follows: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—Dull; only small lots called for at quoted rates, which are about as follows for the best makes:

Best Refined, Nos. 26, 27 and 28... 3 $\frac{1}{4}$ @ 3 $\frac{1}{4}$ ¢
Best Refined, Nos. 18 to 25... 3 @ 3 $\frac{1}{4}$ ¢
Common, $\frac{1}{4}$ ¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28... 4 $\frac{1}{4}$ ¢ @ 4 $\frac{1}{4}$ ¢
Best Bloom Sheets, Nos. 22 to 25... 4 @ 4 $\frac{1}{4}$ ¢
Best Bloom Sheets, Nos. 16 to 21... 3 $\frac{1}{4}$ ¢ @ 3 $\frac{1}{4}$ ¢
Blue Annealed... 2.8 @ 3 ¢
Best Bloom, Galvanized, discount... 62 $\frac{1}{2}$ ¢
Common, discount... 67 $\frac{1}{2}$ ¢

Merchant Steel.—There is not much demand, and prices are unchanged, as follows: Tool Steel, 8 $\frac{1}{4}$ ¢; Machinery, 2.6¢; Crucible Spring, 4 $\frac{1}{4}$ ¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Balls.—There is not much business doing at the prices now asked, but makers seem to be firm at \$27.50 @ \$28 at mills. Western mills are said to have taken some large orders within the past few days, but for the present only small orders seem to be within reach of the Eastern mills. Sales for 1889 delivery aggregate about 500,000 tons up to this date.

Old Balls.—There is a fair demand, but any attempt to buy good-sized lots leads to an immediate stiffening in prices, showing that stocks are extremely limited. Sales of small lots have been made at from \$24 to \$24.50, delivered at mill in the interior, and \$23.50 is bid for Philadelphia deliveries, and \$24 @ \$24.50 asked.

Scrap Iron.—The market is steadier and sales have been at about the following quotations: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought Iron Pipe.—There is a moderate demand, considering the season, and prices are fairly steady, although there is more or less irregularity in the case of large orders. Discounts nominally as follows: Black Butt-Welded, 52 $\frac{1}{2}$ ¢; Galvanized do., 42 $\frac{1}{2}$ ¢; Black Lap-Welded, 62 $\frac{1}{2}$ ¢; Galvanized do., 52 $\frac{1}{2}$ ¢; Boiler Tubes, 60 ¢.

Nails.—There is no change to notice in this line. Store prices are \$1.90 @ \$2, but carload lots of some brands are offered at \$1.80 @ \$1.85, and, although they are not such Nails as people want, they have a very demoralizing effect on the market.

Louisville.

LOUISVILLE, KY., December 10, 1888.

Pig Iron.—The market has been quiet during the week, with but few sales to report, and those for small quantities. Buyers are not willing to purchase freely until the close of the year. Advices from our customers, however, are to the effect that they expect to buy in January, and it is thought there will be no decline in the market. There has been no change in prices during the last week, and sales have been made at about the prices quoted

heretofore. Unless something unusual interferes it is thought January will bring buyers at present prices, and the tendency will be to steady the market and probably advance it. All grades of Iron can be obtained, and the scarcity of Softeners is no longer felt, as this grade of Iron is offered in considerable quantities. There is a growing demand in this section for Bessemer Iron, but Car-Wheel grades are rather quiet. We quote as follows:

Southern Coke, No. 1 Foundry, new classification... \$16.50 @ \$17.00
Southern Coke, No. 2 Foundry, new classification... 16.00 @ 16.50
Southern Coke, No. 3 Foundry, new classification... 15.50 @ 16.00
Gray Forge... 15.00 @ 15.50
White and Mottled, different grades... 14.00 @ 14.50
Silver Gray, different grades... 15.50 @ 16.50
Southern Charcoal, No. 1 Foundry... 17.75 @ 18.25
" " No. 1 Mill... 16.00 @ 17.00
Southern Car-Wheel, standard brands... 22.75 @ 23.75
Southern Car-Wheel, other brands... 19.00 @ 21.00
Hanging Rock Coke, No. 1 Foundry... 17.00 @ 17.50
Hanging Rock Charcoal, No. 1 Foundry... 20.75 @ 22.00
Hanging Rock, Cold Blast... 22.00 @ 25.00
Hanging Rock, Warm Blast... 19.00 @ 20.00

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. }
CINCINNATI, December 10, 1888. }

Pig Iron.—The feature of special prominence in the local market during the week has been the urgent demand for Car-Wheel Iron reflecting the large orders placed for new cars by some of the largest railroad companies in the country. The standard brands of Car-Wheel are reported to be sold well up, and of the other grades much difficulty is experienced in obtaining the numbers desired. A few round lots of Forge Iron are reported to have been sold in St. Louis by Cincinnati firms during the past few days, but in the aggregate there probably has been less doing. Many large buyers have already contracted for necessities for several months ahead, and the others disposed to await the turn of the year, while small buyers are not taking hold with the avidity which sellers anticipated. Although consumption is large, production is steadily increasing. Prices of most all kinds are well sustained, and a steady but quiet market is foreshadowed until after the holidays.

Foundry.

Southern Coke, No. 1 (new classification)... \$16.25 @ \$16.75
Southern Coke, No. 2 (new classification)... 15.50 @ 16.00
Southern Coke, No. 3 (new classification)... 15.00 @ 15.25
Ohio Soft Stone Coal, No. 1... 17.00 @ 17.50
Ohio Soft Stone Coal, No. 2... 15.50 @ 16.00
Mahoning and Shenango Valley... 18.00 @ 18.50
Hanging Rock Charcoal, No. 1... 21.00 @ 22.50
Hanging Rock Charcoal, No. 2... 19.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1... 18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2... 17.50 @ 18.00

Forge.

Strong Neutral Coke... 15.00 @ 15.25
Mottled Neutral Coke... 14.00 @ 14.25
Gray Forge... 14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel... 20.00 @ 25.00
Hanging Rock, Cold Blast... 22.00 @ 25.00
Lake Superior Car-Wheel and Malleable... 21.00 @ 22.00

Manufactured Iron.—There is a moderate degree of activity at present, and orders for some time ahead are booked on the basis of old quotations, and, although there is a feeling of confidence and a spirit of firmness, it does not appear likely to result in any change of prices in the near future.

Old Material.—There has been some demand, and a firmer market for Old Rails, with sales in several hundred ton lots at \$23.50 $\frac{1}{2}$ ton, spot cash. Old Wheels have remained quiet, but steady, at \$19, spot.

Nails.—There has been a fair demand, but the market has been more freely supplied and prices have been barely sustained.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, December 10, 1888.

Pig Iron.—It is being claimed by some that the demand has fallen off to some extent during the past two or three weeks. This may be so, to some extent, which can be readily accounted for, from the fact that it being near the close of the year when all manufacturing concerns desire to put their stock and accounts in the most tangible shape, to enable them to ascertain their financial condition as near as possible at the close of the year; yet it is a fact that prices have been fully maintained, and there are no evidences of weakness as yet in sight. It may have been true, perhaps, that a very few holders have sold at a slight concession, but they are exceptions if they have occurred. The better way to judge of the true condition of the market is to refer to actual sales that have been made from time to time during the past two weeks. In this time several round lots of No. 1 Foundry have been sold to go East, netting the furnaces \$14.25, less 2½ % commissions. These sales aggregate 9500 tons, deliveries to run monthly to April 1. These sales were made for cash on delivery, but the cash is seldom realized under 30 to 40 days from date of shipment. We also note a sale of 2000 tons No. 3, at \$13, four months, at furnace bank, deliveries to run till May 1. Inquiries for spot cash Iron in 100 and 200 ton lots, free of commission, and immediate delivery, f.o.b., elicit from the Birmingham district the following quotations: No. 1 Foundry, \$13.50; No. 2, \$12.25; Open Bright, \$12.75; Gray Forge, \$12.

Bar Iron.—All the Southern mills are running to their full capacity, with about three months' orders ahead, at 1.80¢ rate in carload lots. One of the mills recently sold 2500 tons on private terms.

General business is good, and all the manufacturers are running full.

Cleveland.

CLEVELAND, December 10, 1888.

Iron Ore.—With the last cargoes of Ore for the season now being unloaded at lower lake ports buyers are turning their attention to 1889, and are speculating upon possible changes in lake freights and Ore quotations. It is now believed that the question of transportation rates will be settled by January 15th, and it would not be surprising if an active buying movement set in at that time. As nearly as can now be estimated the amount of unsold Ore on the docks at Cleveland, Fairport, Ashtabula, Toledo, Sandusky, Huron, Lorain, Erie and Buffalo amounts to 170,000 tons, as against 750,000 tons at the close of last season. The total amount of Ore received at these ports during the past season slightly exceeds 3,800,000 tons, as against 3,440,000 tons in 1887, 2,270,500 tons in 1886 and 1,500,000 tons in 1885. The shipments to the furnaces from the ports above named during the season aggregate 2,650,000 tons, leaving about 1,825,000 tons of Ore on the docks at the present time, 91 per cent. of which is sold. Buffalo seems to be increasing in importance as a shipping point for Ore, the receipts at that port for the past season being 240,000 tons, as against 28,000 tons last year. Several furnacemen are now negotiating for all-rail shipments of Ore during the winter months, and sales under this arrangement will be effected within a few days. Buyers are already asking for prices on the odds and ends comprising the 170,000 tons of unsold Ore on the docks.

Pig Iron.—The market is just now passing through the quiet period always experienced at the close of the year.

Orders in any considerable quantity are not looked for before the middle of January. The prices to be paid for next season's Ore will probably have been determined by that time, and any necessary alterations in Pig Iron quotations can then be made. The consumption of Iron continues at an almost unprecedented rate, and there is no thought of taking any of the furnaces that are fit for work out of blast. The quiet tone now prevailing is accounted for by the fact that buyers do not usually want any unnecessary stocks on hand when the annual inventory is taken. It is said that \$15.90, cash was paid during the week for 900 tons of Gray Forge at the furnaces, scattering sales of Mill Iron at about \$16.50 @ \$17, cash. The reported effort of millmen to force down prices is offset by the fact that the furnacemen have not only not accumulated stocks, but are quite unable to fill their orders. The following are cash quotations:

Nos. 1 to 6 Lake Superior Char-	
coal.....	\$20.50 @ \$21.50
No. 1 Strong Foundry, Bessemer	
quality, ½ ton.....	18.20 @ 19.00
No. 1 Strong Foundry, ½ ton.....	18.00 @ 18.50
No. 2 Strong Foundry, ½ ton.....	17.00 @ 17.50
No. 1 American Scotch, ½ ton.....	18.25 @ 18.70
No. 2 American Scotch, ½ ton.....	17.20 @ 17.70
No. 1 Soft Silvery, ½ ton.....	18.50 @ 19.00
Mahoning and Shenango Valley	
Neutral Mill Irons, ½ ton.....	16.00 @ 16.50
Mahoning and Shenango Valley	
Red Short Mills, ½ ton.....	17.00 @ 17.50

Scrap Iron.—Old American Rails are again held at \$25, with a few small orders reported. No. 1 Wrought also commands high figures.

Manufactured Iron.—Small lots of Common Bar are bringing 1.70¢, with the demand far in excess of the supply. The Sheet-Iron market is very firm, No. 27 being held at \$3 and other numbers correspondingly high.

Nails.—There is no change in the Nail market. Common Iron Nails are again selling freely at \$1.90, and Steel at \$1.95.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, December 10, 1888.

The general Iron situation has developed nothing of importance during the past week, but the mills and furnaces generally still have about all they can do in working up old contracts. As a great many jobbers, and consumers as well, make it a point to close the year with as little stock as possible the outlook for the coming year is very generally regarded as favorable. It is expected that there will be more miles of railroads built in 1889 than ever before, and that the consumption of Pig Iron will exceed that of any former year. A cargo of 1300 tons of Southern Pig Iron arrived here from the Cumberland River furnaces the past week, and additional shipments, it is said, will be made. It is brought here all the way by river, in barges, and the freight, it is evident, is very low. The distance is about 1200 miles, and it is probable the cost of transportation did not exceed a couple of dollars per ton. There is talk here of organizing a barge line for the transportation of Iron Ore and Pig Iron from Missouri, Alabama and Tennessee to this port, and they could be loaded back with Steel Rails, Coke, Coal, &c. Large shipments of Rails have been made from here to the South for some years past by river, the rate being much less than by rail, and shipments in not a few instances are delivered as quickly by river as by rail.

Pig Iron.—There has been no important change in the situation since our last report; business continues light, as it usually is at this time, and it is not likely that there will be any improvement until after the new year, as consumers generally will make it a point to close the old one

with as little stock as possible. It is customary with a good many furnacemen to make contracts in January for Ore; some of them may contract for a year's supply, but the probability is that there will not be the same disposition to contract so far ahead unless the price is reduced considerably below what the Ore companies are now expecting to realize. In regard to Pig Iron, there is no indication of any falling off in the consumption; on the contrary, there is a possibility that the requirements of this district in 1889 will exceed those of 1888; but be this as it may, it is generally conceded that Ores have been higher this year relatively than Pig Iron, and furnacemen want cheaper Ore or a higher price for Pig Iron, and of the two they think the latter the most preferable. Prices remain unchanged as compared with those of a week ago, as follows:

Neutral Gray Forge.....	\$15.75 @ \$16.25, cash.
All Ore Mill.....	16.50 @ 16.75, "
White and Mottled.....	15.00 @ 15.50, "
No. 1 Foundry.....	17.75 @ 18.00, "
No. 2 Foundry.....	17.00 @ 17.25, "
No. 1 Charcoal Foundry.....	23.50 @ 24.00, "
No. 2 Charcoal Foundry.....	21.00 @ 21.50, "
Cold Blast Charcoal.....	25.00 @ 27.00, "
Bessemer Iron.....	17.25 @ 17.50, "

Included in the sales reported was a lot of 1000 tons Bessemer at \$17.25, cash, at which it is now freely offered.

Muck Bar.—There is less inquiry, and the market is easier, although prices remain unchanged at \$29 @ \$29.50, cash; while there was a sale of 500 tons reported at the outside quotation, \$29.50, most of the trade receive it as an outside price.

Manufactured Iron.—While there is not much new business just now, mills generally are pretty well employed in working up former contracts. Prices without quotable change, although they are not as well supported as they were a month or so ago. We continue to quote Bars at 1.80¢ @ 1.85¢; Plate, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢; Skelp, 1.85¢ @ 1.90¢ for Grooved, and 2.10¢ @ 2.15¢ for Sheared, all 60 days, 2¢ off for cash. There is but little demand for Skelp Iron.

Nails.—There is no change in the situation here; Pittsburgh manufacturers are still holding out for card rates and refusing to sell for less, but they are not making sales. Wheeling is said to have stiffened, but manufacturers there are still below the card, and, as a matter of course, buyers will not pay full card rates as long as they can buy for less.

Wrought-Iron Pipe.—The demand continues to fall off, and, as competition is more active, prices are being cut to such an extent that it is difficult to give reliable quotations.

Old Rails.—There is less doing, but prices are still maintained; we continue to quote at \$25 @ \$25.25, cash, for American Tees, with a small sale reported at \$25.10.

Steel Rails.—While manufacturers still quote at \$28, cash, at mill, it is claimed that orders for delivery in the North and Southwest have been accepted at prices considerably below the one quoted. Competition is active, and for desirable orders prices are being cut very close. The syndicate does not touch prices, its chief object being to regulate production.

Billets, &c.—Bessemer Steel Billets are weaker and are now quoted at \$28.50, and Nail Slabs at \$28. Some of the works are busy making Steel Ship Plates. Domestic Bloom and Rail Ends are quoted at \$19 @ \$19.50. Mills generally are pretty well employed and likely to be for some time to come.

Merchant Steel.—There is a fair business at unchanged prices. Best brands Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-Hearth Machinery, 2½¢.

Railway Track Supplies.—Spikes are quoted at \$2.15 for 30 days, but sales are reported below the price quoted. Splice Bars \$1.85¢ @ \$1.90, cash, f.o.b. Pittsburgh, and Track Bolts at 2.85¢ with square and 2.95¢ with hexagon Nuts.

Old Material.—The demand continues rather light, but prices are maintained. No. 1 Wrought Scrap, \$21 net ton; Wrought Turnings, \$13 @ \$14; Car Axles, \$25.50 @ \$26.50; Cast Scrap, \$15.50 @ \$16, gross; Cast Borings, \$12 @ \$13; Car-Wheels, \$19.50 @ \$20; short pieces Old Steel Rails, \$18.50 @ \$18.75; long lengths ditto, \$20.50 @ \$20.75.

Detroit.

WILLIAM F. JARVIS & Co., under date of December 10, report as follows: The market remains in about the same condition as a week ago. A few round lots have been placed at full prices, but the majority of orders received were for small amounts and prompt delivery. Southern Gray Forge is at present most in demand. With a fairly active market we quote as follows:

Lake Superior Charcoal, all numbers	\$20.00 @ \$20.50
Lake Superior Coke, all ore	19.75 @ 20.25
Lake Superior Coke, cinder mixed	18.00 @ 18.50
Standard Ohio Black Band	19.75 @ 20.25
Southern No. 1	17.75 @ 18.25
Southern Gray Forge	16.25 @ 16.75
Southern Silvery	17.00 @ 17.50
Jackson County (Ohio) Silvery	18.50 @ 19.00
Old Wheels	20.00 @ 21.00

New York.

Office of *The Iron Age*, 66 and 68 Duane street.
New York, December 12, 1888.

Business in many departments of the Iron and Steel trades has drifted into a very unsatisfactory condition. Importers are doing practically nothing, and in the lines in which home products have exclusive sway the developments of the past few weeks have led to sharp disappointment. Steel Rails, it is true, have recovered somewhat from their lowest position, but the situation is not without its element of danger. But it is particularly in manufactured Steel in which demoralization is greatest. Plates and Structural Shapes, with the exception of Beams, have been sharply cut, and Merchant Steel has dropped considerably in price. With all this raw material, Pig Iron and Old Material have held their own exceedingly well in spite of an unprecedented production. The outlook for Ore points to higher values, and Coke seems certain to rise in the near future close to \$1.50 point at ovens in Connellsville. One feature in the situation is that the low prices alluded to have come almost exclusively from one quarter. Great as the capacity of the group of concerns alluded to is their withdrawal, imminent at any time, from the aggressive attitude taken may easily cause a rebound to more remunerative figures.

Foundry Pig.—The local market is quiet, and as yet the leading company have made no announcement of their intentions beyond the intimation that prices will not be higher. We hear that furnaces in the Chattanooga district have booked considerable orders for delivery in this market and New England, one furnace alone selling about 12,000 tons principally for delivery during the first three and six months, at \$18 and \$17 for No. 1 and No. 2. The principal carrier of Southern Iron has been urged to build two additional steamers, and a good deal was expected from these increased facilities. We understand, however, through a good source, that for the present this is not to be done. The greater part of the stock of off-grade Iron accumulated at one of the furnaces in this vicinity has been disposed of, chiefly to Pipe foundries, at \$13 and upward, at furnace. We continue to quote Standard

to Choice No. 1, \$18 @ \$19.50; No. 2, \$17 @ \$17.50, and Gray Forge nominally \$16 @ \$16.50.

Scotch Pig.—We quote Coltness, \$21, nominally; Shotts, \$20.25 @ \$20.75; Langloan, \$20.25 @ \$20.75, and Dalmeilington, \$19.50 @ \$19.75.

Spiegeleisen.—We quote nominally, in the absence of business, \$27 for 20 % Spiegeleisen, and \$54 for 80 % Ferromanganese.

Plates.—During the week a leading Western mill has taken the contract for the Government vessel at an upset price of 2½¢ a pound, this, including Boiler as well as Ship Plates, subject to the rigid Government inspection and long credit. The same concern has secured the Plates for four vessels to be built by Roach, the quantity involved being about 3000 tons. The market has been weak, with concessions being liberally made, and business being sought even by large mills, with small buyers. We quote Iron Tank, 2¢ @ 2.2¢; Shell, 2.25¢ @ 2.4¢; Steel Tank and Ship Plate, 2.15¢ @ 2.25¢; Shell, 2.35¢ @ 2.5¢; Flange, 2.6¢ @ 2.75¢, and Fire-box, 3½¢ @ 4¢.

Structural Iron.—The market continues weak on everything, except Beams. It is rumored that a contract for 12,000 tons of elevated work for Brooklyn, the business, however, not going to the two mills which have till now taken the bulk of that class of work in that quarter. We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2¢ @ 2.10¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢ on dock for all sizes. Foreign Beams are quoted 2.55¢ @ 2.75¢.

Bar Iron.—We quote: Carload lots on dock, half extras, Common; 1.7¢ @ 1.75¢; Medium, 1.75¢ @ 1.8¢, and Refined, 1.8¢ @ 2¢.

Merchant Steel.—The market has been completely demoralized by the withdrawal already alluded to of a leading mill from the association. Spring Steel, cut to lengths, has been sold in moderate lots, delivered in this State at 2.25¢, six months flat. The bulk of the Sleigh Shoe contracts for the season were placed before the decline, as well as a great many lots of Tire Steel. Considerable of this business is being readjusted. Steel Shafting has sold at 2¢, delivered in New England, including odd sizes.

Steel Rails.—The situation is not quite clear yet. Eastern mills' sales have been made, aggregating about 8000 tons, the greater part at private terms. Evidence is adduced to show that \$28 is being underbid, and there is good reason to believe that \$27.50 has been done, while the assertion has been made that \$27 would not be rejected. In the West there have been a number of large sales, details of which are withheld. But the market there is still irregular. New quotations of \$26.50 at Pittsburgh have been made, and it is reported on good authority that buyers have been given to understand, in more than one case, by one Western mill that any quotations made in certain territory will be met. Among the contracts known to have been placed are a lot of over 20,000 tons to a Northwestern road, and a lot of 7000 tons to a Kentucky road, and a like amount to a Colorado road. It is certain, however, that for the present at least the low figures quoted some time since, say, \$25 in the West and \$26 in the East, are not being made. There has, therefore, been a clear advance of \$1 @ \$2.50 per ton, according to locality, and a further rise is not improbable.

Old Rails.—No sales of any consequence are reported, the demand and the supply both being light. We quote \$23.25 @ \$23.50 for Tees.

Wire Rods.—The market is dull, with moderate sales of Basic at \$39, and Acid offered at \$38, ex-ship.

Warren, Wood & Co., 115 Broadway, are introducing the Melrose brand made by the Citico Furnace, Chattanooga, to compete with imported Scotch. They submit the following comparative analyses:

	Melrose.	Langloan.	Carnbroe.	Williamson.
Silicon....	1.28	1.23	2.93	2.18
Phosphorus...	0.81	0.73	1.12	0.85
Sulphur....	0.03	0.02	0.03	0.07
Carbon....	3.88	4.13	3.63	3.46

Changes have taken place in the firm of A. R. Whitney & Co., of this city.

Financial.

General business is expanding in steady volume, and in local trade reports are at least fairly good. The total clearing house exchanges of all the principal cities show an increase of 18 % compared with last year. In New York the increase is 16.8 %, and outside of New York 33 %. At nearly all manufacturing points the improvement is decided. All along the northern lakes and at the Northwest the gain is not less noticeable. At New Orleans and Memphis there is a heavy movement in cotton and the sugar crop is being marketed rapidly. The stimulus in railway transportation arises from important arrangements relative to freight tariffs, the attempt at readjustment having made good progress. A Chicago dispatch says the action of the Central Traffic Association in ordering a restoration of east bound freight rates December 17 to the basis of 25 cents on grain and flour and 30 cents on provisions, from Chicago to New York, has stimulated shipments to an extraordinary extent.

The aggregate for the week was 93,391 tons, against 61,361 tons for the previous week. This, with one exception, is the heaviest week's business in the history of the roads. Corn shipments were particularly heavy. In unison with the above and in accordance with previously received instructions, the Eastern agents of all Southwestern railroads on Saturday put into effect a practical advance from previous rates of 20 to 40 %. The advance makes first-class freight \$2.68; second class, \$2.12; third, \$1.78; fourth, \$1.48; fifth, \$1.23; sixth, \$1.19; seventh, \$1.04. But it is estimated that these figures are not strictly adhered to. President Depew, speaking for the trunk lines, is quoted as saying: "We are entirely harmonious, and East and West, matters were never in better condition." Nevertheless, the railroad situation is considered complicated, and there are misgivings respecting the permanency of anything that is done. The reassembling of Congress had little effect.

The Stock Exchange markets became almost buoyant when Missouri Pacific decided to advance rates to a paying basis, regardless of what the other roads might do, and on Friday it was announced that a full restoration of west-bound rates had been made. The result was that at Saturday's closing prices nearly the whole of the decline of the 10 days previous had been recovered. For the first time in years Rock Island went below par, touching 97½. A settlement of the Oregon Navigation difficulties was reached by the Union Pacific and Northern Pacific, and these properties closed strong. An unfavorable bank statement and news that at least \$1,000,000 was engaged for export caused general weakness. Lower prices in London, caused by reports of a proposed advance by the Bank of England established lower values on Monday. On Tuesday the movement was irregularly

downward with New England weakest, but in the final dealings there was a rally.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered.....	108
U. S. 4½s, 1891, coupon.....	108
U. S. 4s, 1907, registered.....	127½
U. S. 4s, 1907, coupon.....	128½
U. S. currency 6s.....	113

The total amount of bonds purchased to date, under the circular of April 17, is \$99,024,050, of which \$51,396,650 were 4% and \$47,627,400 were 4½%. The cost of these bonds was \$117,450,457, of which \$66,010,877 was paid for the 4% and \$51,439,579 was paid for the 4½%. Maurice L. Muhleman succeeds William Sherer as cashier of the Sub-Treasury in New York City.

The weekly statement of the New York City Associated Banks issued on Saturday showed a loss in surplus reserve of \$2,872,725. The banks now hold \$7,203,825 in excess of legal requirement. The changes in the averages show a decrease in loans of \$2,314,700, a decrease in specie of \$4,449,900, an increase in legal tenders of \$428,300, a decrease in deposits of \$4,595,500, and a decrease in circulation of \$240,900. Money is rather more active, and for time loans there is a fair demand, which is met chiefly by trust companies and out-of-town institutions. Rates on good collaterals are 4% for four months or less and 4½% for longer dates. Commercial paper is offering more freely, and rates are 4½% @ 5% for 60 @ 90 days. The posted rates for bankers' sterling are \$4.85 @ \$4.85½ for 60-day and \$4.89 for sight. The market is strong and occasions some apprehensions that there may be a loss of specie, which would be ill timed with reference to the annual settlements.

The wheat market is unsettled and dull at the close. Corn dropped 1½¢. Cotton is firm at about 9½¢ for spot. In coffee there is a slump, caused by favorable accounts from Brazil. Sugars are steady but dull. The Hawaiian sugar crop promises to be the largest crop ever gathered, reaching fully 120,000 tons, as compared with 110,000 tons for the past season. In provisions there was a break, caused by a raid in Chicago. Dry goods jobbers report a good inquiry for anything that could be shipped before the 17th inst., when advanced freight rates take effect. In the grocery trade orders from the South are becoming more important, but all sales are on a closer margin.

The imports of merchandise at this port during the week were \$8,553,659, of which amount \$1,676,000 represents dry goods. Since January 1 the total is \$436,314,000, against \$440,952,000 for the same time last year. The total of merchandise landed here last month was \$32,877,955, against \$38,300,880 for November of last year. The exports for the month are a disappointment, the total, exclusive of specie, being \$25,446,574, which is one and a half millions below the corresponding total of last year and over \$3,000,000 less than the same return for 1886. Since January 1 the total exports from New York, exclusive of specie, were \$271,009,000, as compared with \$288,976,000 for 11 months in 1887. For two months the trade of the entire country shows an adverse balance of \$55,000,000.

Metal Market.

Copper.—London has remained unaltered during the entire week so far as Chili Bars are concerned, which remain £77. 10/, spot, and £78, futures, good merchantable brands improving 10/ @ £78, and Best Selected giving way to £80. 10. Sales have not exceeded 75 tons. Since the pool sale, alluded to in our last report, our own market has exhibited the same listless feeling and inactivity; what

little transpired has been at 17.25¢ to 17.30¢ for Lake, and 16½¢ for Casting brands. The Anaconda's contract with the syndicate expiring with the current year, it was at first reported that the mine had now already shut down and was to receive \$300,000 monthly for doing nothing till the end of next year, 4¢ per lb profit having been secured it on a fixed estimated output for remaining idle. This was contradicted from Butte City; it was stated that the mine had shut down temporarily, owing to a strike, and resumed work since, the said strike being at an end. There is an impression, however, that some such arrangement has either been concluded or is still in course of negotiation, and that the statement made had merely leaked out prematurely. The fire in the Calumet and Hecla Mine is said to be diminishing, and that it is believed it will soon be under control; at any rate, not much importance as affecting production seems to attach to it at present. Financial matters at Paris, including Copper shares, begin to look very blue, the Panama Company being in desperate straits, with the shares down from 500, where they formerly stood, to 145, and not a franc to be got except through a Government guarantee, which there is considerable hesitation about. For if France, as a maritime power, is to assume the work of the canal, which it would drift into by any guarantee given, it is to be presumed the Monroe doctrine would prevent the United States from remaining a passive looker-on, and such an eventuality the present weak Government of France is seemingly not prepared to run the risk of. If the Panama Canal Company, is on the other hand, allowed to go to pieces French capitalists, large and small, will have to face a dead loss of 1,000,000,000 francs to begin with, and a financial and political crisis is unavoidable, which could hardly fail to affect the Société des Métaux in its financial arrangements, present and prospective. The export of American Copper the first ten months has been 28,773,591 lb, against 10,552,893 in 1887. Spain exported during the first eight months 569,682 tons of Pyrites, against 535,645 last year and 476,163 in 1886, and 18,448 tons of Precipitate, against 18,519 and 17,781.

Tin.—A decline took place in the London market since our last report from £99. 5/, spot, Straits, to £98. 5/, and futures from £99. 15/ to £98. 15/. Sales, 990 tons. Here the market has been irregular, winding up tamely at 21½¢ @ 22¢, spot and December, and 21.65¢ @ 22.15¢, January, while in a jobbing way the price is nominally 22½¢ @ 22½¢ at the close. The import of Tin into the United States the first 10 months has been 27,600,261 lb, against 25,169,673 lb same time last year, while there were re-exported respectively, 118,150 lb and 109,425 lb. **Tin Plates.**—There has only been a moderate demand during the week at a shade lower prices, especially in futures, which are influenced by the decline in Pig Tin. Some orders have been entered in Wales at lower prices, but the bulk of orders are still pending. We quote at the close, large lines, 9 box: Siemens-Martin Steel, Charcoal Finish, \$4.75 @ \$5.50; ditto, Coke Finish, \$4.65 @ \$4.70; Terns, \$4.12½ @ \$4.25; Coke Tins, \$4.22½ @ \$4.30; and Wasters, \$4.12½ @ \$4.15. Cokes are 13/ in Liverpool. The imports into the United States during the first ten months have been 577,556,721 lb, against 545,428,369 same time last year, and the re-export 763,626 lb, against 1,038,462.

Lead.—Has been dull and featureless, sales on the spot being restricted to 200 to 300 tons Common Domestic at 3.75¢ @ 3.80¢, for the most part at the outside figures, the closing quotation also being 3.75¢ @ 3.80¢. At St. Louis the market

is flat at 3.50¢ @ 3.55¢, and at Chicago at 3.50¢ @ 3.60¢. The English market is weak in consequence of bullion from the New World and Australia arriving there more copiously; the London quotation is £12. 15/, Soft Spanish, and £13, English Pig. Spanish exportation during the first eight months has been 88,962 tons, against last year 88,048 tons and 75,126 in 1886.

Spelter.—Only a moderate demand has prevailed on the spot, which has been filled without difficulty at 5¢ @ 5½¢ for Common Domestic, while Silesian cannot be quoted any better than 6¢, nominally, the London quotation being £18. 10/. The Spelter Committee on the Metal Exchange has revised the list of brands desirable on contract by eliminating objectionable ones. The export of Calamine from Spain during the first eight months has been 22,325 tons, against 19,917 tons same time last year and 20,335 in 1886.

Antimony.—Has continued quite active, while the available supply is reduced to a minimum. London cables Hallett higher, £44. 10/ @ £45, and here the same may be quoted 10½¢ @ 11¢; Cookson, 12½¢ @ 13¢.

New York Metal Exchange.

The following sales are reported:

THURSDAY, December 6.	
10 tons Tin, February.....	21.75¢
10 tons Tin, February.....	21.65¢
FRIDAY, December 7.	
10 tons Tin, February.....	21.85¢
10 tons Tin, January.....	22.00¢
10 tons Tin, January.....	22.05¢
SATURDAY, December 8.	
10 tons Tin, spot.....	22.00¢
10 tons Tin, February.....	22.25¢
MONDAY, December 10.	
20 tons Tin, December.....	22.15¢
10 tons Tin, February.....	22.30¢
TUESDAY, December 11.	
16 tons Lead, April.....	3.85¢
16 tons Lead, April.....	3.90¢

Coal Market.

The Anthracite Coal trade is very dull, and stocks at shipping ports are accumulating, with the effect of softening prices. Even the hard Lehigh fancy brands are in liberal supply, contrary to the usual conditions. Coal men impatiently await the advent of winter weather. Production at the mines, as reported for the week ending December 8, reflects more decidedly the policy of restriction now in force, with the design of imparting steadiness to the market. The total from the three regions is 708,684 tons, a decrease of 72,000 tons compared with the previous week, and 123,000 less than for the week ended a fortnight ago. For the first time this year the total is less than for the corresponding week in 1887. Since January 1 the aggregate is 36,212,747 tons, against 32,816,717 for the same time last year. It is noticed that the shut-down shows conspicuously in Lehigh Valley. A Philadelphia report says: Individual operators in the Wilkesbarre region have been offering all sizes of Coal in that market at a cut of from 15¢ to 20¢ per ton, shipments Westward via the great lakes having been suspended since the close of navigation. Shipments to tidewater via the canals have also about closed. Navigation on the Lehigh Canal has stopped for the season. The Schuylkill Canal will close on the 15th inst., and the Delaware and Raritan Canal on the 20th, unless closed by ice at an earlier date. Freight from New York to Boston are quoted at \$1.05 @ \$1.25.

Bituminous Coal remains unchanged, and in liberal supply.

The accounts of the shipments of Anthracite Coal over the Reading Railroad for the fiscal year ending November 30 show an aggregate of 7,350,320 tons, against 7,493,801 tons in the fiscal year of 1887.

The Jersey Central, Lehigh Navigation and Reading Railroad companies secured

control of the Lehigh and Hudson River Railroad at the annual election of that company. The new route by the Poughkeepsie bridge will connect the Pennsylvania Coal field more closely with the East.

Several of the big Coal roads propose forming a Coal route through Rochester to Lake Ontario at Charlotte.

The hearing of the E. B. Coxe Lehigh Valley Railroad case by the Interstate Commerce Commission has been postponed until January 25.

Buffalo received by the Erie Canal during the season just closed 298,948,492 lb of Anthracite, against 118,877,035 lb in 1887. The amount of Coal passing through the Sault Ste. Marie Canal this season was 2,135,041 tons, as against 1,352,987 tons last season.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from December 1 to December 6, inclusive, and from January 1 to December 6, inclusive, were as follows:

Iron and Steel.

	Dec. 1. to Dec. 6. Tons.	Jan. 1 to Dec. 6. Tons.
Iron Ore: A. Earnshaw.....	278	8,140
Pig Iron: Crocker Bros.....	402	14,624
G. T. Carter.....	225	1,330
James Williamson & Co.....	300	5,600
G. W. Stetson & Co.....	100	14,450
N. S. Bartlett.....	100	5,400
R. F. Goodwin & Sons.....	100	100
Spiegel Eisen: Crocker Bros.....	542	12,339
J. Abbott & Co.....	30	380
Steel: A. Milne & Co.....	52	1,283
R. H. Wolf & Co.....	45	690
J. J. Thomsen.....	27	27
W. F. Wagner.....	26	1,447
S. Strauss & Son.....	25	25
R. F. Downing & Co.....	23	303 1/4
Vulcan Steel Wire Co.....	12	12
Chas. Hugill.....	11	206 1/4
F. S. Pilditch.....	10	510
Newton & Shipman.....	5	150
C. W. Power.....	3	59
C. F. Boker.....	3	228 1/4
Temple & Lockwood.....	1	23
Steel Rods: Naylor & Co.....	470	19,277
Dana & Co.....	300	6,384
S. A. Galpin.....	250	3,120
R. H. Wolf & Co.....	136	3,936
A. Heyn.....	91	1,703
Cary & Moen.....	49	913
Steel Nail Rods: Naylor & Co.....	103	103
Steel Sheets: M. Strouse & Co.....	25	25
Pierson & Co.....	20	1,088
Steel Plates: Naylor & Co.....	22	273 1/4
A. R. Whitney & Co.....	19	31
Steel Bars: Naylor & Co.....	31	402
Iron: G. Lundberg.....	50	739
A. Milne & Co.....	36	236
Iron Rods: Naylor & Co.....	150	847
Iron Girders: R. F. Downing & Co.....	25	560 1/4
Charcoal Iron: A. Milne & Co.....	5	179
Cotton Tie: Wheelock & B. Bullard & W.....	25	950
	10	1,755

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	12,803	587,289
A. A. Thomsen & Co.....	8,539	152,491
N. L. Cort & Co.....	5,772	111,988
T. B. Coddington & Co.....	5,220	168,207
Bruce & Cook.....	4,178	97,001
Dickerson, Van Dusen & Co.....	4,128	262,669
Pratt Mfg. Company.....	1,720	160,611
R. Crooks & Co.....	1,454	67,287
Jas. Byrne & Son.....	1,200	34,801
Lombard, Ayres & Co.....	1,050	14,165
Merchant & Co.....	853	23,765
E. S. Wheeler & Co.....	785	10,758
Central Stamping Company.....	629	35,449
Hy. Whittemore & Co.....	496	47,882
S. Shepard & Co.....	442	19,471
C. S. Mersick & Co.....	247	6,728
Lalanc & G. Mfg. Co.....	230	5,422
Hibbard, Spencer B. & Co.....	182	132

Metals.

	Pounds.	Pounds.
Tin: Knauth, Nachod & Kuhne.....	22,490	119,126

Hardware, Machinery, &c.

Boker, Hermann & Co., Arms, cs., 3	
Dunham, Buckley & Co., Hdw., cs., 2; Needles, cs., 1	
Field, Alfred & Co., Mdee., cs., 22	
Folsom, H. & D., Arms, cs., 6	
Graef Cutlery Company, Cutlery, cs., 21	
Lau, J. H. & Co., Arms, cs., 5	
Schoverling, A., Arms, cs., 8	
Schultz, W. & Co., Hdw., cs., 7	
Sheldon, G. W. & Co., Mach'y, pkgs., 170	
Sacks & Richmond, Nails, cs., 11	
Ward, J. E. & Co., Mach'y, pkgs., 2	
Wetbusch & Hilger, Lim., Hdw., cs., 9; do., cs., 2; Razor Hones, cs., 1	
Order: Mach'y, cs., 18	

Exports of Metals.

	Dec. 1. to Dec. 6. Pounds.	Jan. 1. to Dec. 6. Pounds.
Copper: J. Abbott & Co.....	13,132,530	4,041,522
Lewisohn Bros.....	2,581,293	6,018,291
F. A. Lomal.....	223,439	112,000
American Metal Company.....	560,000	110,276
G. H. Nichols.....	430,000	224,034
J. Bruce Ismay.....	112,025	1,250
S. Mendel.....	449,881	125,000
Ledoux & Co.....	1,451,130	93,820
Muller, Schall & Co.....	420,000	448,809
Copper Queen Con. M. Com- pany.....	112,000	250,000
J. Kennedy, Tod & Co.....	6,250	51,840
H. Becker & Co.....	189,984	229,371
Orford C. & S. Rfg. Company.....	4,000	1,000
Robt. M. Thompson.....	102,865	37,955,404
Thos. J. Pope, Sons & Co.....	3,121,610	4,364,830
Williams & Terhune.....	357,447	939,800
J. Parsons & Co.....	184,288	722,777
Naylor & Co.....	180,986	41,652
Bridgeport Copper Com- pany.....	224,000	2,472,015
C. Herold.....	224,000	449,024
Phelps Bros.....	224,000	224,000
Burgess & Co.....	27,738	679,312
R. W. Jones.....		
Ladenburg, Thalmann & Co.....		
W. H. Crossman & Bro.....		
R. Crooks & Co.....		
Copper Matte: Williams & Terhune.....		
Lewisohn Bros.....		
American Metal Company.....		
J. Abbott & Co.....		
C. Ledoux & Co.....		
F. W. J. Hurst.....		
G. H. Nichols.....		
H. T. Nichols & Co.....		
Kunhardt & Co.....		
Lead: Joseph Gillet.....		
Sanderson & Son.....		
American Metal Co.....		
Old Copper: Burgess & Co.....		

Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper.....	@ \$0.13
Light Copper.....	@ .10
Copper Bottoms.....	@ .10
Brass, Heavy.....	@ .08 1/4
Brass, Light.....	@ .08 1/4
Composition.....	@ .09 1/4
Lead, Heavy.....	@ .03 1/2
Tea Lead.....	@ .04
Old Zinc Cuttings.....	@ .03
Wrought Iron.....	16.00 @
Light Iron.....	8.00 @
Stove Plate Iron.....	9.00 @
Machinery Iron.....	12.00 @
Grate Bars.....	@ 6.00
Old Rubber Springs.....	@ .04 1/2
Old Rubber Shoes.....	@ .03 1/4
White No. 1.....	@ .03 1/4
White, No. 2.....	@ .01 1/2
Canvas, Linen, No. 1.....	@ .04
Canvas, Cotton, No. 1.....	@ .03 1/4
Canvas, No. 2.....	@ .03 1/4
Seconds.....	@ .01
Soft Woollens.....	@ .07
Mixed Rags.....	@ .01
Gunny Bagging, No. 1.....	@ .02
Jute Butts.....	@ .02 1/4
Book Stock.....	@ .01 1/4
Newspapers.....	@ .00 1/2
Waste Paper.....	@ .00 1/4
Hemp Twine.....	@ .06
Sisal Baling Rope.....	@ .08 1/2

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Dec. 12, 1888.

The Block-Tin market has reacted sharply from last week's decline, under the influence of purchases by operators who oversold and found it necessary to cover, in view of the small stocks here. The course of the market has led to a more or less general belief that a revival of speculative demand would bring about a considerable advance. The high rates for money check outside speculation, however, and now that the "short" interest is well covered up prices have shown a tendency to decline again.

Copper speculation has been spiritless, and the syndicate agents are the only buyers who manifest the slightest confidence in the market. Outside "short" selling, as well as buying, is on a very limited scale, and the purchases by consumers are diminishing rather than improving. Standing orders given by the syndicate to

buy prompts at £77. 10 and futures at £78 serve to sustain the market. It is the fact, however, that while the prices of Bars are maintained, the market for manufactured Copper is in poor shape. Sales have been made at £4 under prices fixed by the syndicate, and even at that concession the volume of business is unsatisfactory.

Tin Plate business has been moderate and at somewhat variable prices. Very little change is apparent in the rates for prompt deliveries, but orders have been taken for January and February at a decline from previous prices. The production continues to be on a large scale, and the report has circulation that two more new works have been projected. The exports to the United States last month were 24,000 tons, or about the same as those of October. The total for the past 11 months is about 270,600 tons, against 252,500 tons for the corresponding period last year.

Pig-Iron warrants have declined a trifle under the influence of realizations caused mainly by the high rates current for money. Additional furnaces are blowing out because of difficulties as to fuel, &c., and that fact operates in a measure to offset the unfavorable influences. The demand for consumption and export, however, is not very brisk at the moment. Makers' brands of Scotch are held firmly, as is also Middlesboro' Pig, while Hematites have ruled strong on continued active demand from consumers. The exports of Pig Iron to the United States last month were 14,000 tons, making a total of 138,000 tons since January 1, against 375,000 tons for the corresponding period last year.

The Finished Steel and Iron departments continue active to a degree that is much in contrast with the customary experience at this period of the year. Nearly all works in the various sections have liberal orders in hand and old plant is being brought into use. The large capacity, however, leads to competition that prevents prices from advancing a great deal. Among important contracts placed the past week were 14,000 tons Steel Rails with the Ebbwvale Company and a similar quantity with the Cockerill Company. Prices for Rails are fully 1/3 higher than a week ago, so fully are the mills employed, but Billets and Slabs could doubtless be bought at some concession on the nominal prices. Manufacturers are offering Wire Rods at 5/ decline from the prices they have asked previously this month.

The demand for Old Iron Rails, Scrap Iron, &c., has fallen off somewhat and prices for the same are scarcely as firm as they were a week or ten days ago.

Scotch Pig.—There has been a fair business and prices for all branches are firm. Glasgow freights are a trifle lower.

No. 1 Coitness, f.o.b. Glasgow.....	50/6
No. 1 Summerlee, ".....	50/6
No. 1 Gartsherrie, ".....	48/6
No. 1 Langloan, ".....	50/6
No. 1 Carnbroe, ".....	44/6
No. 1 Shotts, " at Leith.....	49/6
No. 1 Glengarnock, " Ardrossan.....	48/6
No. 1 Dalmellington, ".....	42/6
No. 1 Eglinton, ".....	42/6

Steamer freights, Glasgow to New York, 8/; Liverpool to New York, 10/.

Cleveland Pig.—The market has been fairly active and prices are firmer. No. 1 Middlesboro', G. M. B., 36/6; No. 3 do., 34/.

Bessemer Pig.—There has been a large business and sales are reported at 6d rise. West Coast brands, mixed numbers, 45/, f.o.b. shipping point.

Spiegeleisen.—The output is closely taken up and prices remain firm. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—Business continues brisk and the market strong, with prices somewhat higher. English sections quoted at £4, and light sections £4. 2/6 @ £4. 12/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—There is but little doing in these. We quote £3. 18/9 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A good business reported, but at somewhat irregular prices. Bessemer, 2½ x 2½ inch, £4. 1/3, f.o.b. at N. W. England shipping point.

Steel Slabs.—Demand fairly active and prices steady. Bessemer, £3. 18/9, f.o.b. at N. W. England shipping point.

Old Rails.—Trade rather slow at the moment and prices a shade easier. Tees quoted at £3. 5/ @ £3. 7/6, and Double Heads, £3. 7/6 @ £3. 10, c.i.f. New York.

Scrap Iron.—A moderate business and prices barely steady. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Crop Ends.—Small sales making at about former prices. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—A fair trade in Cokes for future delivery at variable prices. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/3 @ 15/8
IC Bessemer steel, Coke finish.....	@ 13/6
IC Siemens.....	@ 13/3
IC Coke, B. V. grade.....	13/ @ 13/3
Charcoal Terme, Dean grade.....	12/ @ 12/3

Manufactured Iron.—The market remains firm, and business is still of good volume. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars.	@ 8 2 6
Common.....	@ 5 10 0
Staff. Bl'k Sheet, singles.....	@ 7 10 0
Welsh Bars (f.o.b. Wales).....	5 0 0 @ 5 2 6

Tin.—After advancing on covering of "short" sales the market is dull and rather weak. Straits quoted at £98. 5/ @ £98. 10/, spot, and £98. 15/ @ £99 for three months' futures.

Copper.—Trade slow and prices unchanged, except for Best Selected English. Chili Bars, £77. 10/, spot, and £78 three months' futures. Best Selected, £80.

Lead.—The demand slow and prices rather weaker. Soft Spanish, £12. 15.

Spelter.—Business smaller this week, but prices fairly steady. Silesian, ordinary, £18. 10/.

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira.....	Cent.
Florin (Netherlands).....	40.2
Florin (Austria).....	36.9
Milreis (Portugal).....	51.08
Milreis (Brazil).....	54.6
Mark (Germany).....	23.8
Kilogram.....	Pounds.
Picul.....	2.205
	134.

EAST INDIES

SINGAPORE, December 5, 1888.—**Tin.**—Shipments from the Straits Settlements to the United States during November have amounted to 450 tons, against 50 last year, and to England 1200, against 2250; since January 1 they were respectively 3400, against 4150, and 16,900 against 14,750, making a total during 11 months of 20,300 tons this year, against 18,900 last year, which is an increase of 1400 tons, or about 7 % cent.—*Gillilan, Wood & Co., per cable to their agent, Mr. Charles Nordhaus, 89 Water street, New York.*

MANILA, December 3, 1888.—**Hemp.**—There has been hardly anything done, and the price is nominally \$11.62½ ¢ picul, against \$9.25 same time last year, equaling, cost and freight, ¢ ton £40. 7/6, against £32. 16/6. There cleared for the United States since last cable 7000 bales, against none last year; since January 1 229,000 bales, against 238,000; loading for do., 22,000, against 14,000; cleared for England since January 1 325,000, against 4000; loading for do., 8000, against 4000; cleared for all other ports, 66,000, against 42,000; receipts at all ports since last cable, 8000, against 5000; since January 1, 608,000, against 501,000, and 372,000 in 1886. **Freight,** £7, against \$3.50. **Exchange,** 3/7½, against 3/8.—*Ker & Co., per cable to their agent, Mr. Charles Nordhaus, New York.*

COLOMBO, CEYLON, October 25, 1888.—**Plumbago.**—The market has been quiet during the week at steady rates, the quotations being, in rupees, ¢ ton: Large Lumps, 145 @ 170; Ordinary Lumps, 125 @ 160; Chips, 80 @ 95, and Dust 40 @ 65. Following have been the shipments since October 1: To England, 8806 cwt.; to Hamburg, 851, and to the United States 2380—together, 12,037, against last year 6312; 31,840 in 1886, and 18,152 in 1885. **Coir Yarn.**—Nos. 1 to 4, 7 @ 12 rupees ¢ cwt. **Exchange.**—Six months' sight, 1/5 1-16.—*Volkart Brothers, through John W. Greene, 82 Wall street, New York.*

SPAIN

BILBAO, November 24, 1888.—**Iron Ore.**—Some inquiry has been noticeable, and several transactions have taken place, chiefly in Rubios, at rather irregular and slightly easier figures, the closing quotation for the same being 6/10 @ 7/3, and for good Campanil 8/3 @ 8/6, a few cargoes bringing either above or under these rates. More would have been done but for the scarcity of steamers. As in several Baltic ports navigation has meanwhile closed, greater animation may soon arise from increased tonnage seeking cargo. Total shipments to date sum up 3,264,963 tons, against 3,857,087 last year. **Pig Iron.**—Coastwise some 2056 tons were shipped, and to Ancona, in Italy, 1753.—*Bilbao Maritimo y Comercial.*

BELGIUM.

BRUSSELS, December 1, 1888.—**Iron.**—Our market has been steady; there has been some buying of Pig for account of rolling mills in Luxembourg, supposed to have been at 4 @ 4.2 francs ¢ 100 kg., at the blast furnaces, the former equaling 5.10 francs at the rolling mills. Luxembourg, on the other hand, has not yet recommenced selling Pig Iron at Belgium on a larger scale, except in cases in which stocks had accumulated at the furnaces, there being too good a market for Luxembourg Pig in Germany, where it is paid 4.60 francs at present. The German market is for some time past, however, a most fluctuating one, hence anomalies of the kind will occur. News about the Beam market is of a contradictory nature. It is asserted that a syndicate of makers is on the eve of formation in Northern France to uphold prices in that country, which, if true, would be good for ours who have frequently had to suffer from French competition. Thus not long ago a lot of Beams was sold at 11 francs ¢ 100 kg., free on board, at Antwerp, which would have been the extreme minimum figure in Belgium for Domestic Beams. On the other hand, we are told that the Belgian firm of Halot, Louvain, which quite recently secured the big job of building the La Plata bonded workhouses at Buenos Ayres, has bought 5000 tons Steel Beams of the Rothe Erde German Works superior in quality to ours, the latter making a specialty of the same. The fact is that Steel Beams will bring about a revolution in Belgian industry quite as much as Steel Rails did. In order to confront the crisis our works made large Beams a sort of monopoly, and held their ground; the case alluded to will serve as a hint to them. Still, the superseding of Iron by Steel does not take place in an alarming manner yet; thus we still succeeded in exporting during the first nine months 210,000 tons of Finished Iron, against 80,000 tons Steel, the former showing a slight decrease as compared with last year, and the latter an increase.—*Moniteur des Intérêts Matériels.*

Oliver's oat meal mill, in Chicago, was torn to pieces by a violent explosion on Tuesday morning, and three workmen were killed. Buildings in the vicinity were wrecked. This is the second mill of the kind burned in Chicago recently, and a distillery in that city having been destroyed by dynamite a few days ago, opinions differ respecting the cause of the explosion. Mr. Oliver rejects the meal-dust theory.

The American Institute Fair will close on Saturday evening.

The Charcoal Iron Workers.

Last week the United States Association of Charcoal Iron Workers held its ninth annual meeting in this city, the proceedings being opened with a business session on the 5th inst., after which the members partook of an elaborate dinner on board of the Noordland. Tuesday morning was devoted to a business session, at which the following officers were elected:

President: Irving M. Bean, Milwaukee, Wis.

Vice-Presidents: H. R. Stoughton, Shelby Iron Works, Alabama; Geo. B. Wiestling, Mont Alto, Pa.; J. S. Van Alstyne, Wyandotte, Mich.

Secretary and Treasurer: John Birkinbine, Philadelphia.

Board of Managers: J. D. Potts, Philadelphia; J. C. Fuller, Pine Grove Furnace, Pa.; George M. McCauley, Harrisburg, Pa.; L. Heber Smith, Joanna, Pa.; A. G. Curtin, Jr., Roland, Pa.; R. H. Lee, Lewistown, Pa.; John Birkinbine, Philadelphia; Percy Warner, Warner, Tenn.; Dr. H. M. Pierce, Nashville, Tenn.; Chas. H. Brown, Knoxville, Tenn.; W. H. Rood, Ishpeming, Mich.; J. A. Mathieu, Detroit, Mich.; H. H. Noble, Elk Rapids, Mich.; F. P. Miles, Copake Iron Works, N. Y.; M. Lyman, Waverly, N. Y.; Walter Crafts, Columbia, Ohio; W. N. McGugin, Olive Furnace, Ohio; E. S. Noble, Anniston, Ala.; Willard Warner, Nashville, Tenn.; H. A. Crawford, St. Louis, Mo.; W. H. Lee, St. Louis, Mo.; O. D. Case, Hartford, Conn.; M. B. Richardson, Lime Rock, Conn.; M. Hogland, Rockaway, N. J.; M. R. Hunt, Ashland, Wis.; C. E. Coffin, Murrkirk, Md.; George G. Lobdell, Wilmington, Del.; E. W. Crichton, Oswego, Ore.; Jacob Wissler, Max Meadows, Va.; E. Sjosdedt, Katahdin, Me.

The following Executive Committee was appointed: Joseph D. Potts; J. C. Fuller, George G. Lobdell.

The meeting passed the following resolutions:

Resolved, That the Executive Committee be requested to present to the association a revision of the constitution, and also to consider and report upon any suggestions for reorganization.

Resolved, That a committee of five be appointed, with power to add to their number, to memorialize Congress, urging that such action be taken in regard to our tariff laws or custom duties as will more perfectly encourage and protect the manufacturers in the United States of the various products in which the membership of the association is interested.

In the afternoon, by invitation, the members and their ladies visited Edison's Laboratory, at Llewellyn Park, where an elaborate exhibition of the wonders of the phonograph were given, and the workings of the magnetic separator were inspected.

A toothpick factory is one of the flourishing woodworking establishments of Harbor Springs, Mich. White birch is exclusively used in the manufacture of the toothpicks, and about 7,500,000 of the little splinters are turned out daily. The logs are sawed up into bolts each 28 inches in length, then thoroughly steamed and cut up into veneer. The veneer is cut into long ribbons 3 inches in width, and these ribbons, eight or ten at a time, are run through the toothpick machinery, coming out at the other end, the perfect pieces falling into one basket, the broken pieces and refuse falling into another. The picks are packed into boxes, 1500 in a box, and are then put into cases, and finally into big boxes, ready for shipment to all parts of the world.

The new Chicago and Northwestern Railroad bridge across the Missouri River was formally opened to traffic, 6th inst. The bridge cost \$1,500,000.

Hardware.

With the close of the year there is a falling off in the volume of business and in most lines there is comparatively little doing. It is not the season when manufacturers usually announce changes in price, but in a number of lines there are indications of somewhat lower quotations than have prevailed. Jobbers and manufacturers who are still making active efforts to market their goods are showing a disposition to make concessions to induce purchases, and some of the Western houses are quoting exceptionally low prices. The outlook for a satisfactory trade with the opening of the next season continues good.

Barb Wire.

The New York market is characterized by a limited demand, but prices within the territory covered by the agreement between the Eastern manufacturers are well maintained, quotations being as follows: Galvanized Four-Point 3.6 cents in carload lots; 8-ton lots 3.7 cents, and small lots 3.9 cents.

Cut Nails.

New York sellers agree in reporting a better volume of business thus far this month than they did in November, a favorable sign, considering that we have entered the duller season of the year. Prices remain at \$1.80 @ \$1.90 for carload lots on dock. The meeting at Wheeling yesterday has no special significance to the Eastern trade, because the Western mills have not been sellers in this market to any extent for some time past. It is of interest, however, as showing that the makers of the Ohio Valley, including 14 large mills who can sway the Western trade, have at last grown tired of the demoralized condition of the trade. The Eastern makers hold a meeting here tomorrow, the first for a long time.

We have received the following dispatch from Wheeling: An adjourned meeting of the Cut Nail manufacturers of the Ohio Valley, including 14 mills, was held at the office of the Benwood Company, at Wheeling, yesterday. The pooling scheme was abandoned, the Western firms declining to agree to it. The Western Cut Nail Association was organized, J. N. Vance being elected president and Edward Hazlett secretary. A \$1.90 card was adopted, with the usual discounts. The opinion prevails that the influence of the new association upon the market will not amount to much.

Miscellaneous Prices.

The Fork and Hoe Makers' Union held a meeting in Cleveland on the 5th inst. There was a large attendance and the reports of orders in hand were very satisfactory, showing that nearly all the makers present had sold up to their allotments. The union, as an organization, did not take any action on prices, but most of the members independently agreed to advance prices 5 per cent., making the regular discount 65 per cent., instead of 65 and 5 per cent., as heretofore. These indications point, it will be observed, to a strong and satisfactory condition, and the combination is regarded by the trade as in excellent condition.

The market on Pistols is in a more satisfactory condition than recently prevailed, there having been a recovery from the exceedingly low prices lately ruling. The manufacturers of both Bull Dogs and Double-Action Revolvers are holding the goods firmly at the advanced prices, and it is thought very probable that there will

before long be a further advance. It is intimated that the delay in announcing such advanced prices has been to give parties holding the goods purchased at low figures an opportunity to dispose of them, with a view to avoiding disturbance of the market by the offering of these goods at irregular prices.

An advance was announced by the Cordage manufacturers December 6 on both Manila and Sisal Rope, the quotations for which are as follows, subject to a discount of 1½ per cent. for cash in 10 days:

Manila, ¼ inch and larger.....	12½	cents per lb
Manila, ⅜ inch.....	13¼	"
Manila, ½ and 5-16 inch.....	13¾	"
Manila Tarred Rope.....	12½	"
Manila Hay Rope.....	12½	"
Sisal, ¼ inch and larger.....	10½	"
Sisal, ⅜ inch.....	11¼	"
Sisal, ½ and 5-16 inch.....	11¾	"
Sisal Hay Rope.....	10½	"
Sisal Tarred Rope.....	10½	"
Sisal Medium Lath Yarn.....	9½	"

The market is regarded as very firm, this advance having been caused by increased prices for Hemp, both Manila and Sisal, and also by a shortness of the supply. The market is active, Binder Twine being especially so, in the production of which the manufacturers are running to their fullest capacity.

The following is the price list of the Freeport Hardware Mfg. Co., Freeport, Ill., for their line of Spring Hinges and Door Springs. It is subject to a discount of 40 per cent., f.o.b. cars Freeport, Ill.:

	Per gross pair.
Wiles' No. 1 Spring Hinges.....	\$34
Wiles' No. 2 ".....	30
Devore No. 1 ".....	30
Devore No. 2 ".....	26
Devore No. 3 ".....	22
Rex Spring Hinges (3 x 3 Covered Coil).....	32
Devore No. 1 Door Springs, per gross.....	15

James F. Brook Rubber Company, Trenton, N. J., issue a sheet of quotations on Belting, Hose, Packing, &c.

Wire Goods Company, Worcester, Mass., have issued the following discount sheet applying to their catalogue, December, 1888:

	Discount per cent.
Bright Wire Goods.....	85
Mill Wire Goods.....	40&5
Wire "S" Hooks.....	55&10
Belt Hooks.....	75&10
Spring Cotters.....	60&10
Cary's Wardrobe Hooks.....	60&10
Cary's Shutter Knobs.....	60&10
Umbrella Racks.....	25
Towel Brackets.....	70&10
Splash Holders.....	70
Coat and Garment Hangers.....	50
Telegraph and Desk Hooks.....	70&10
Kitchen Hooks.....	70&10
Regalia and Hat Pins.....	70&10
Steel Wardrobe Hooks.....	70&10
Brass Wardrobe Hooks.....	70&10
Brass Coat and Hat Hooks.....	70&10
Picture or Mirror Hooks.....	70&10
Screw Hooks, No. 1412.....	75, 10&10
Cup Hooks, No. 181.....	75, 10&10
Tassel Hooks.....	70&10
Braced Screw or Chandelier Hooks.....	50&10
Bird Cage Hooks.....	60, 10&10
Chandelier Hooks, No. 410.....	60&10
Chandelier Hooks, No. 510.....	70&10
Brass Line Cleats.....	60&10
Malleable Line Cleats.....	60&10
Cast-Iron Line Cleats.....	60&10
Agate Spinner.....	60
Iron Hooks and Eyes.....	70
Brass Hooks and Pins.....	60&10
Hooks and Eyes.....	60&10
Wrought "S" Hooks.....	80&10
Hitching and Hammock Rings.....	70
Hitching Eyes.....	80
Locker or Shutter Rings.....	80
Stable or Hitching Rings.....	70
Hitching Rings.....	70
Hand-Rail Screws.....	70
Rail Dowels.....	70
Eye Bolts.....	60, 10&10
Wrought Screw Hooks.....	60, 10&10
Eye or Swing Bolts.....	70
Well-Wheel Hooks.....	70
Hammock Hooks.....	60, 10&10
Universal Chain.....	5
Catt e Leaders.....	70
Clothes Line Wire.....	45&5

Wire on Spools (1 ounce spools):

Annealed Steel.....	35&2
Tinned Steel.....	35&2
Soft Copper.....	25
Wax Flower or Hair Wire.....	35&2
Bright and Annealed Wire on Spools.....	35&2
Annealed Tin Wire on Spools.....	35&2
Pure Soft Copper Wire on Spools.....	25
Picture Cord.....	60&5
Curtain Pole Brackets.....	50
Patent Extension Sling.....	75
Iron Pokers, No. 1.....	50
Ring Pokers, Nos. 11 to 121.....	40
Wood Handle Stove Pokers.....	40
Stove Flue Scrapers.....	40
Stove Cover Lifters.....	40
Corn Beef or Brine Hooks.....	50
Wire Meat Hooks, Nos. 43, 44 and 45.....	80&10
Meat Hooks.....	80&10
Finger Nail Trimmers.....	30&10
Elastic Steel Door Mats.....	25
Wire Twine Boxes.....	40
Wire Puzzles.....	60
Package Handles.....	15
Suspension Rings.....	25
Improved Wrought Staples.....	80&10
Steel Hooks and Staples.....	80&10
Steel Rings and Staples.....	80&10
Wrought Rings.....	80&10
Wrought Hinge Nails.....	75&10
Corrugated Broilers.....	70
Standard Broilers.....	60
Twisted Handle Broilers.....	50&10
Hotel Broilers No. 74.....	70
Riveted Hotel Broilers No. 204.....	60
Oyster Broilers.....	65
Bread Toasters.....	80&10
Pot Cleaners.....	60
Glove Pot Cleaners.....	60
Dish Cloth Holders.....	50
Saratoga Potato Fryer.....	37½
Vegetable Boilers.....	50
Meat Rests.....	50
Dish Drainers.....	50
Cross Toasters.....	50
Vegetable Skimmers.....	30&5
Vegetable Lifters.....	30&5
Potato Mashers.....	50
Kitchen Forks.....	50
Paper Racks.....	10
Spiral Egg Beaters.....	65
Spoon Egg Beaters.....	50
French Egg Whips.....	40
Baker's Egg Whips.....	40
Stove-Pipe Shelves.....	30&10
Egg Boilers.....	40&10
Sponge Baskets.....	50
Sponge Baskets, Light Pattern.....	50
Hair-Brush Holders.....	50
Tea and Coffee Pot Stands.....	50&10
Pie-Plate Stands.....	50
Table Mats.....	50
Soap Dishes.....	60
Soap Brackets.....	60
Shirt Rests.....	50
Picture Easels.....	40
Cup and Saucer Easels.....	40
Plate Easels.....	40
Placque Easels.....	25
Card Receivers.....	15
Millinery Stands.....	25
Fancy Baskets 336 and 338.....	25
Fancy Wire Baskets 340 to 342.....	25
Tea or Coffee Strainers.....	60&10
Black Handled Strainers 709 add 710.....	37½
Black Handled Strainers 698 to 702.....	50&10
Wire Handled Strainers 704 to 708.....	50&10
Bowl Strainers 712 to 714.....	50
Bowl Strainers 716.....	40
Globe Rat Traps.....	50
Combined Rat and Mouse Traps.....	40
Rat Traps.....	40&5
Animal Traps.....	50
Toy Mouse Traps.....	40
Dome Mouse Traps.....	40
Wire Dish Covers.....	50&10
Dish Covers (extra size).....	30&10
Ox Muzzles, Light Pattern.....	50
Improved Ox Muzzles.....	40&10
Horse Muzzles.....	37½
Double Pointed Tacks (in papers).....	80
Double Pointed Tacks (in bulk).....	60
Clamp Staples No. 5 (in papers).....	50
Clamp Staples No. 5 (in bulk).....	50
Casket and Hoop Staples.....	60, 10&10
Butter or Tobacco Tub Staples.....	60, 10&10
Copper Nail Staples.....	15
Rattan and Willow Staples.....	50
Shade Tacks (in papers).....	60
Shade Tacks (in bulk).....	50&10
Lightning Belt Fasteners.....	40&10
Norway Clinch Staples.....	60, 10&10
Steel Spring Staples.....	60, 10&10
Electricians' Staples.....	40&10
Bed-Spring Staples.....	60, 10&10
Blind Staples.....	70
Hinge Staples.....	60&10
Poultry-Net Staples.....	60&10
Speaking-Tube Staples.....	60&10
Steel-Wire Carpet Tacks (in papers).....	50&10
Steel-Wire Carpet Tacks (in bulk).....	50&10
Copper and Brass Tacks (in papers).....	50
Copper and Brass Tacks (in bulk).....	50
Iron Escutcheon Pins.....	50&10
Brass Escutcheon Pins.....	55&10

Steel-Wire Trunk Nails.....	60
Copper & Brass Finishing Nails.....	50
Spiral-Grooved Box Nails.....	60
Solomon Gundy Nail Box.....	40&10
Nail Keg and Store Truck.....	40

Butterfield & Co., Derby Line, Vt., write us that during the past year they have made extensive additions to their plant and are again in the market with a full line of Blacksmiths' Stocks and Dies and Taps. They also issue a new illustrated catalogue in which these goods are shown. They advise us that the price on their Blacksmiths' Goods is from discount 30 and 5 to 30 and 10 per cent., the price on Reece's new Screw Plates being from discount 33½ and 5 per cent. to 40 per cent.

It is to be noticed that the prices of Brass and Copper goods are not as firmly maintained as would be supposed from the condition of the market in the raw material. Difficulty is found in holding these prices up to a normal level, and they are recently giving increased evidences of weakness.

There has been no change in Shot, notwithstanding the condition of the Lead market. Prices are regarded as low, and it is thought probable that an advance will soon be announced.

The present season has been an exceptionally satisfactory one for Skate manufacturers, and some of them are referring to their inability to supply the goods with sufficient promptness to meet the requirements of the trade, some of whom are annoyed at not having their orders executed in time for the opening of the season.

Items.

Buhl, Sons & Co., Detroit, Mich., are issuing a new illustrated catalogue which will take its place among the most complete and satisfactory. It is a noble volume of 1206 pages, which are filled with information relating to a very extensive assortment of Hardware and its related lines. The volume is fully illustrated with excellent representations of the different goods, and presents the goods in a systematic and compact arrangement. The catalogue opens with Metals, Iron, Nails, &c., and ends with Guns, Fishing Tackle and Sporting Goods, all the regular departments of Hardware being represented, with many related lines, including Tinnings' and Blacksmiths' Tools, Household Specialties, Cutlery, &c. More than 5000 illustrations are given in the book. It has an exceptionally complete index, the extent of which may be inferred from the fact that 26 three-column pages are devoted to it. It is also to be observed that only such goods as are carried in stock are catalogued. In the introductory circular to their customers it is announced that their business was established in 1855. In 1865 they began the manufacture of Pig, Bar and Sheet Iron, Nails, &c., at Sharon, Pa., where they employ 1200 men. They state that they use in their mills only the best materials and turn out a product of exceptional quality. No discount sheet is issued by the house, but as values are constantly fluctuating they will quote prices on application. It is their aim to fill all orders on the day received and to give the trade the benefit of the lowest prices ruling on the day of shipment. This catalogue will be an important addition to Hardware literature and will doubtless be appreciated by those who are favored with it, and it cannot fail to be of service to the enterprising house which has issued it in still further enlarging their extensive business.

Freeman Wire Company, St. Louis, Mo., have issued a handsome catalogue which illustrates their goods. It relates to Plain and Barbed Fence Wire, Staples,

&c., and a large variety of Ornamental and Plain Wire and Ironwork, including Bank and Office Railings, Sand, Coal and Ore Screens, Store Fixtures, Flower Pot Stands, Wire Signs, Stable Fixtures, Window Guards, Elevator Enclosures, Crestings and Finials, Iron and Wire Fences, &c. The plant of the company consists of the Wire Mills at East St. Louis, Ill., where they manufacture Iron and Steel Wire, Galvanized, Bright, Tinned, Coppered and Annealed, and all kinds of Plain and Barbed Fence Wire, and of the Wire and Ironworks at 410 North Main street, St. Louis, which are referred to as fitted with complete appliances and machinery for the manufacture of artistic Wire and Ironwork; 106 pages are used in displaying this line of goods, of which, in connection with the cuts, list prices and descriptive matter are given.

The New Haven Wire Goods Company, New Haven, Conn., whose Broiler and Toaster is described on page 917, besides their agencies in Boston, New York and Philadelphia, are represented in the West by Sidney Shepard & Co., Buffalo, N. Y.; the George Worthington Company, Cleveland, Ohio; Standart Bros., Detroit, Mich.; C. Sidney Shepard & Co., Chicago, Ill., and F. A. Lawson & Co., Cincinnati, Ohio.

Montgomery & Co., 105 Fulton street, New York, have lately been appointed agents for the sale of H. H. Barton's Emery Paper, Emery Cloth and Sandpaper in this city. We are advised that the Thrift File Works, of Philadelphia, have also appointed them their agents for New York and the New England States.

The Pittsburgh Tuyere Works, manufacturers of Wrought Copper and Bronze Tuyeres, Coolers and Bosh Plates and Brass and Bronze Castings, Pittsburgh, Pa., have removed their office and works to 83-95 Main street, Allegheny, where they are prepared to fill orders promptly, as heretofore.

It will be observed that among the special announcements on page 50 the Lloyd & Supplee Hardware Company, Philadelphia, Pa., advertise for a salesman with established trade in Western and Southern Pennsylvania. The influential position occupied by this house will doubtless attract attention to this announcement from any Hardware salesmen who are open to accept such an engagement.

James L. Haven Company, Cincinnati, Ohio, have issued their illustrated catalogue No. 15. It comprises illustrations and prices of a large variety of goods, including Shutter, Gate and Spring Hinges, Axle Pulleys, Barn Door Rollers, Grindstone Fixtures, Clamps, Jack Screws, Casters, Bed Fasts, Drills, Tire Benders, Repair Links, Pump Curbs, Meat Cutters, Standard Mills, Agricultural Implements, &c. It is accompanied by a discount sheet of 16 pages in which list prices and discounts are given on this line of goods.

Champion Lawn Rake Company, Canton, Ohio, issue a neat catalogue, in which they describe the different patterns of Lawn Rakes manufactured by them. They include the Champion Steel Lawn Rake, reversible handle, the Champion Reversible Lawn Rake, the Champion Lawn Rake and the Champion Garden Rake.

Fowler & Sons, Buffalo, N. Y., issue a variety of circulars and lists referring to the different departments of their business. They relate to Iron and Steel, their wood-working department, to which a pamphlet of 32 pages is fully devoted; their Trimming, Paint and Varnish department, to which is devoted a pamphlet of 62 pages, covering an assortment of goods in the line indicated, while another relates to the Anderson Bolt Works, Anderson, Ind., of which they are the proprietors. This

gives the standard lists on Common Carriage Bolts, Machine Bolts, Lag Screws, &c., and Square and Hexagon Nuts.

Chadborn & Coldwell Mfg. Company, Newburgh, N. Y., have prepared an exceptionally neat and attractive blotter pad, which is intended to be of use to their customers and also to call attention to their line of Lawn Mowers. The cover of this pad is celluloid, artistically printed in four colors, and under it are half a dozen sheets of blotting paper attached at one end, on each of which is mentioned some point on which they lay emphasis concerning their line of Mowers. The novelty of this device and the attractiveness in which it is gotten up entitle it to special attention.

We desire to call attention to the advertisement of the National Keg and Box Company, Birmingham, Conn., page 50, who advise us that they have extensive mills and facilities for supplying Kegs and Locked Corner Boxes of all kinds to take the place of pasteboard boxes. They also manufacture Hardwood Boxes and Packing Cases.

Chieftain Hay Rake Company, Canton, Ohio, issue a neat pamphlet relating to their Hardware specialties. Post-Hole Diggers are given a prominent place, the Little Giant, Hercules, Scheidler and the New Champion being represented. Portable Tree Protectors, Extension Step-Ladder and the Boys' Tricycle are also shown. The company warn the trade against infringements on their patents for Post-Hole Diggers.

The Avery Elevator Bucket Company, Cleveland, Ohio, announce, December 9, that owing to the extension of their line of manufacture they have decided to change their corporate name to the Avery Stamping Company. They will still continue to make their patent Seamless Steel Elevator Buckets a prominent feature of their business, and, when they are settled in their extensive new works, which, it is expected, will be about December 20, they state they will be prepared to do the most intricate stamping and shaping of metals ever attempted in any country.

A. J. Phillips & Sons, Fenton, Mich., manufacturers of the Bonanza Window Screen, described on page, 918 in addition to their line of Snow Shovels, are also manufacturing the Phillips Adjustable Window Screen Frame, which, they advise us, was satisfactorily tested during the past season by a portion of their trade, and is now offered to the general trade, a large stock being in process of construction. The Frame has wood corner brackets, the sides of which have dove-tail grooves into which slide and engage the dove-tail tongues on the side sticks, and it is pointed out that the dealer or consumer can thus make his own Frame and be sure of securing a fit, as well as a strong and attractive article. The point is specially made that the Frame can be adjusted to any size after it is put together. They are furnished with moldings to cover the edge of the wire cloth and slides for attaching to the window cases. They are made in imitation walnut and in natural red oak.

Trade.

Our Louisville advices, under date December 8, are as follows:

The Hardware trade of Louisville, Ky., is undergoing a steady improvement, both as to value and prices. Those jobbers who had dull business last week feel good over this week's returns. The country is evidently settling down to a fair winter's trade, although the season is quite backward for such goods as enter into cold weather sports. Ammunition continues to go out in large quantities, and Shelf goods are moving satisfactorily. The open winter has the effect of enabling building and improvements, generally, to go on later than usual; this is marked in the sales of Barb

Wire, which, coupled with extremely low prices, enables the country merchant to buy in carload lots, whose wants are usually a few tons at a time. The same conditions govern the trade in Cut Nails, there rarely ever occurring such a large December movement in this staple. The trade hails with joy and yet misgiving the announcement of the promised action of the Nail mills. Wire Nails are still firm, with some large orders offering and looking for a weak-kneed manufacturer. Bar Iron is stiffening from store under strong inquiries for heavy goods; this will probably be followed soon by withdrawals of extreme prices by the mills. One feature that retards trade to a certain extent is that the Tobacco crop of this State and Tennessee has proved to be an enormous one, and well cured, but, because of the great amount grown, prices have dropped so low that it will hardly pay the farmers the expenses of shipping to market. In this way untold thousands of dollars are compelled to lie idle in the curing barns and country warehouses. Lumber coming from Western Kentucky and Tennessee is in such increasing demand, both domestic and foreign, that new saw mills are being set up at all available points on the railroads and streams traversing those sections, and are doing a rushing business. This means prosperity for the manufacturers of such machinery. The hard woods, particularly the white oak, coming from this region, are highly valued both in this country and in Europe. The lands through which the Tennessee Midland is to run have increased in value several times over, being heavily timbered with uncultured virgin forests.

From Dudley Bros. & Lipscomb, Nashville, Tenn., we have the following advice:

Volume of business has been fully as good the past fall as any season heretofore, and notwithstanding the yellow fever and the political excitement we have fully held our own. Crops were extraordinarily fine in growing, but the prospect was considerably marred by continued rains. A large quantity of the corn is still in the fields and much of it has rotted, and cotton picking will not be more than finished in time for planting the new crop; but on the whole enough will probably be saved all right to make business keep up. Prices continue very low, notwithstanding the result of the election. Wire Nails, Shot and other kindred staples are cheaper than ever before. Bar Iron, however, has taken a little turn for the better and is quoted \$1 advance on the ton. Our merchants are stocking up liberally for their Spring trade which usually sets in about the 10th of January.

Trade Topics.

In the existing conditions of business, and with the enterprise which is shown by merchants in different lines, there are indications that a larger variety of goods is being kept by many enterprising houses, and that some of these goods belong to lines other than those which have heretofore been regarded as regularly belonging to their business. It is not infrequently that we hear of furniture dealers handling Stoves, jewelers selling fine Cutlery and grocery houses dealing in Tacks and many kinds of household specialties. In a similar manner Hardware merchants, especially those who have suffered from this encroachment on what they regard as their proper territory, are disposed to enlarge their line of goods. The great Hardware jobbers of the West have thus been adding quite a number of lines which have not heretofore been regarded as belonging to Hardware. They are taking up Lamps, Jewelry and other goods which can be worked in connection with their other regular lines. It is obvious that this can be done with some advantage, giving them an increased variety of goods which they can offer through their travelers to the small trade. In working a town a Cutlery salesman often visits dry goods stores, drug stores, gentlemen's furnishing stores and fine jewelry stores, a fact which illustrates the point made above as to the extent which the lines of separation between the different branches of trade are being obliterated. In the case of the largest jobbing houses this tendency toward expansion of their line is most marked, and is to be accounted for in two ways: In the first place, it is the result of the energy and enterprise possessed by them, which, with their abundant capital, en-

ables them to adapt their business to the constantly changing conditions of trade, and to avail themselves of any opening that may present itself for the extension of their business. And often the fact that their regular Hardware business is being interfered with by the small jobbing houses, which have sprung up all through the Western country, has, doubtless, been influential in inducing this extension of their lines, inasmuch as without such additions to the variety of the goods offered by them it would not be feasible to prevent their business from diminishing in volume, while with these additions their business, notwithstanding new competitions, has probably for the past few years been slightly increasing.

A similar condition of things, though to a less marked degree, prevails in the retail Hardware trade. Instances will occur to our readers in which merchants are showing a disposition to go beyond the lines of demarcation by which Hardware is separated from other classes of trade. It will, however, be conceded that Hard-

The company refer to it as working very satisfactorily, alluding especially to the advantage possessed by it in the fact that there is an economy of time in connection with its use, inasmuch as several invoices can conveniently be paid with one blank.

Ironmongers and their Assistants.

Our English exchanges have recently been discussing the relations existing between merchants and their clerks, and complaints have been made on one side and the other of unreasonable requirements and inconsiderate treatment by the employer and of inattention to business, carelessness and general indifference to their principal's interests on the part of the clerks. The impression gained from reading the letters in this controversy is that there is a too general lack of that understanding which should exist between the merchant and those upon whose energy and fidelity he largely depends for the success of his business, and in this respect the conditions prevailing in England

Memorandum.

R. D. Cone Company,
WHOLESALE HARDWARE.

Winona, Minn. 188.
To.....

Enclosed find Draft in payment of the following Invoice.

Date of invoice.	Gross amount.	Deductions.	Net amount.	Total net.

Please acknowledge receipt and oblige.

Yours truly,

R. D. Cone Company.

ware merchants have been more conservative in this matter than merchants in almost any other line of business, and have been reluctant to enter upon fields which do not properly belong to them. The extent, however, to which merchants in other lines have encroached upon the Hardware business often drives its merchants in self-protection to handle goods which more properly should be sold by some of their neighbors. This condition of things in the abstract is to be regretted. It would on many accounts be more desirable if merchants would keep closer to their own lines of trade, as this tendency is apt to result in diminished margins of profit, and in many ways to be ultimately disadvantageous to the trade.

Writing on the question as to whether or not it is advantageous for retailers to purchase direct from manufacturers, a Hardware merchant in Ohio says:

I have tried several times to buy from manufacturers, but have invariably found that prices, if not higher, were equal to those offered through jobbers, and had to buy more than I needed to obtain the discount. I now buy all I need of jobbers, except a few articles that they do not carry in stock.

Business Methods.

In view of the interest with which the form adopted by Elsworth & Dudley, Poughkeepsie, N. Y., for making their remittances has been regarded by the trade, we reproduce above in reduced size another form for the same purpose, which has been used for several years by the R. D. Cone Company, Winona, Minn. The entire width of this form is 8½ inches, and its depth about 5 inches. It is tastefully engraved and presents a neat appearance.

seem to contrast unfavorably with those which exist in this country. Referring to this matter, and, in a measure, summing up the controversy, the last issue of the *Ironmonger* remarks editorially as follows:

The correspondence which is currently appearing in our columns on the subject of ironmongers and their assistants serves to remind us anew that perfect harmony has not yet been secured between masters and men. Complaints are made by both sides that the other side is very far from being perfect, and it is obvious that there is a good deal of latent irritation in many quarters. It is a pity that this friction should exist, but it is there, and so long as human nature is what it is, there will often be a certain amount of jealousy and distrust between employers and employees. At the same time it is obviously quite within the bounds of possibility for this disturbing element to be reduced within very narrow bounds—indeed, it is not impossible for it to be wholly eliminated by judicious management. The employer who has a good assistant, and knows it, will generally trust that assistant more fully, and leave more to his discretion than he would were the assistant a mere machine at his work, or otherwise not up to the mark. In the same way an assistant who knows his work and takes an interest in it will have his employer's interests so much at heart that he can scarcely fail to earn and have the respect and consideration of his employer. Trust should, and generally will, beget trust, and mutual confidence should have the effect of furthering mutual interests. Where this amicable state of things does not exist, it is palpable that there is room for all sorts of ill feeling and mistrust. In such cases both masters and men cannot fail to suffer. If the employer cannot or does not trust his assistants, his business must involve him in a vast amount of personal worry, and probably actual losses, while if the assistant cannot trust his employer it is practically impossible for him to have his employer's affairs as much at heart as he ought to have. As our correspondence columns have shown, some of the employers complain that some of the as-

sistants are not sufficiently smart or pushing, and compare them disadvantageously with the dapper and alert young men of the drapery trade. It is possible that there may be a certain amount of truth in this allegation and comparison, but even admitting that that is the case, we are inclined to think that the difference is partly owing to the nature of the ironmongery trade and partly the fault of the employers who have trained the assistants. One employer thus may suffer from the faults of some other employer, but if he does so for any length of time it goes without saying that the fault becomes his own. No employer is compelled to keep an assistant who does not serve him well, and if he likes to put up with indifferent or slovenly service then he alone is to blame. If we assume, for the sake of argument, that all assistants are below par, and unequal to the work required at their hands, then it follows that while we deplore their want of capacity we must still attach a certain amount of blame to the employers as a body. The assistants complain that in many instances they are not allowed to see the *Ironmonger*, and thus are not fully posted up in what is going on in the trade by which they live. In the very nature of things this cannot be right or good policy—indeed, one would have supposed that every ironmonger would be only too pleased to let his assistants read and study the *Ironmonger* regularly and constantly. The more information an assistant possesses the better servant he should be; but if the representative paper of the trade is kept from him, it is perfectly clear that he lacks much that ought to be of direct benefit to himself as well as to his employer. We hope that there are very few instances indeed where this policy is pursued, and we are encouraged to express that hope by the knowledge that in many establishments the employer not only subscribes for himself, but also pays for copies for his assistants. In such establishments the whole of the staff are as well posted up as the travelers who call upon the master, and as well informed as the customer who has gained his information from some of the journals addressed to the general public. It is a sound maxim, indeed, which expresses the sentiment that no man can ever know too much, and it applies to the assistant as well as to the employer. With a little more liberality in this and other matters—especially in respect of cost prices—there ought to be a great improvement in the relations between the two grades of those who jointly constitute the retail branch of the trade. We are not without the hope that the improvement is gradually making itself felt. When it has become fully established we may expect to hear very little more of the complaints which have lately been addressed to us both by masters and assistants.

Arrangement of Stores Abroad.

The arrangement of retail stove and hardware stores is a subject which has received a great deal of attention in these columns for some time past, and from letters which have been received from those who have profited by the suggestions contained in the various articles presented, we feel that our efforts in this direction have not been in vain. The subject is of wide interest both in this country and abroad, and the trade papers on the other side are devoting more or less attention to it. A recent issue of *Ironmongery* contains a number of suggestions as to the proper arrangement of the stock of a hardware store, and we present it herewith as of possible interest to our American readers:

This is a subject which appears to us not to have received the attention it deserves—probably because of the obvious difficulties which its discussion involves. The numberless variations in the size and style which are presented by shop architecture make it a subject of the greatest difficulty. Still, it may be assumed that general principles may be laid down, which, while they must necessarily be varied to meet special circumstances, may be found of some practical value. For the purposes of this paper, we will then assume a shop of the usual type, with a frontage of two windows, and the entrance in the center, containing a counter down one side with drawers under it, and range of ordinary fixtures behind, and, if our readers like, a showroom or warehouse behind or above. It is probable, however, in the majority of

cases, that several smaller warehouses have from time to time been brought into requisition, as the expansion in the volume of stock has required it, and in this case the same principles will hold.

We begin, then, with the shop itself. It will be clear to the merest tyro that some system of arrangement is absolutely essential in order that the law of association may be exercised to enable the ironmonger to lay his hand at once upon any required article; hence every ironmonger will, as far as possible, group goods of a kindred character. He will, for instance, keep all his brass foundry together, and on no account allow it, as some slovens do, to be mixed up with a heterogeneous collection of black goods; and he will also extend the principle and arrange according to their classification the various sub-sections of each class of stock. Thus, assuming that he has a range of fixtures extending behind and running the entire length of his counter, he will find them the most convenient depository for his brass foundry and parcel goods generally, placing the first-mentioned nearest the door, because of their lighter and more attractive appearance, and the last-named at the further end, making a clear line of demarcation between the two. He will then arrange the brass foundry in sub-sections, not mixing up rack pulleys, and curtain rings, and fancy nails, and numerous other goods in inextricable confusion; but having a clearly defined space for everything, sash fasteners, for instance, occupying one division, rack pulleys another, and patent blind furniture another, and curtain rings and picture rings and all other articles being grouped in such a manner that to know where the leading article of a section is placed is to know where all the others are. Now, as to the method of keeping the stock, we are strongly in favor of the steel-bound cardboard boxes, which for convenience, attractiveness and cheapness are to be highly commended. Everybody has seen how untidy the best-kept shelves will in course of time become, as parcels have been frequently opened and their contents gradually abstracted, to say nothing of the considerable time involved in unwrapping and wrapping up, and the not inconsiderable expense of paper and twine. This is all obviated, once for all, if these boxes, which have a most neat and attractive appearance, are used, and they can be procured of any size required, so as to fill conveniently any sized division of the fixtures.

Thus, take, for instance, a dozen rack pulleys; let one be fastened on the outside with thin copper or brass wire, and put the remainder in their tissue paper inside, marking the number, cost and selling price inside the lid, and the article is permanently faced. The customer sees at once, while yet upon the shelves, the article he requires. It is taken from the box, the lid replaced, and the box is back upon the shelf in less time than a parcel can be opened. There is an enormous advantage in this, especially on busy days, or when a long "fiddling" carpenter's order is being filled, as every one who has seen the pile of open parcels littering the counter or floor will admit. Another great advantage offered by this system is that its very neatness inculcates a pride in having the remainder of the stock kept with such care and orderliness as not to destroy the *tout ensemble*. The expense need be no objection, as the entire cost of boxes, for fixtures of, say, 16 x 6 feet, would not exceed £3 or £4, and once provided they will last in good condition for many years. This, then, deals with that portion of the brass foundry and black ironmongery which is exposed for sale on shelves. The spare stock should be kept in their original parcels in the warehouse or other convenient place. The arrangement of tools is a most impor-

tant point. Where at all possible, a window should be specially reserved for these, or a portion of a window distinctly separated from the rest. The window should contain a sample of every tool contained in stock, for it is wonderful with what patience a workman will scan everything in the window until he sees the article he requires; and most ironmongers would find that a thoroughly well-dressed tool window would prove to be one of the most profitable investments. The spare tools may be kept in any convenient place, but, as far as possible, together, and always in paper, to protect them from the ravages of rust and dust. Such small tools as Lancashire tools, however, would, with advantage, be kept in drawers under the counter, while the remainder are stored in good deep shelves further away. And our advice to ironmongers and assistants is always to sell from the window where possible, notwithstanding the disarrangement and trouble this may cause, as by doing this the loss by depreciation of stock is reduced to a minimum.

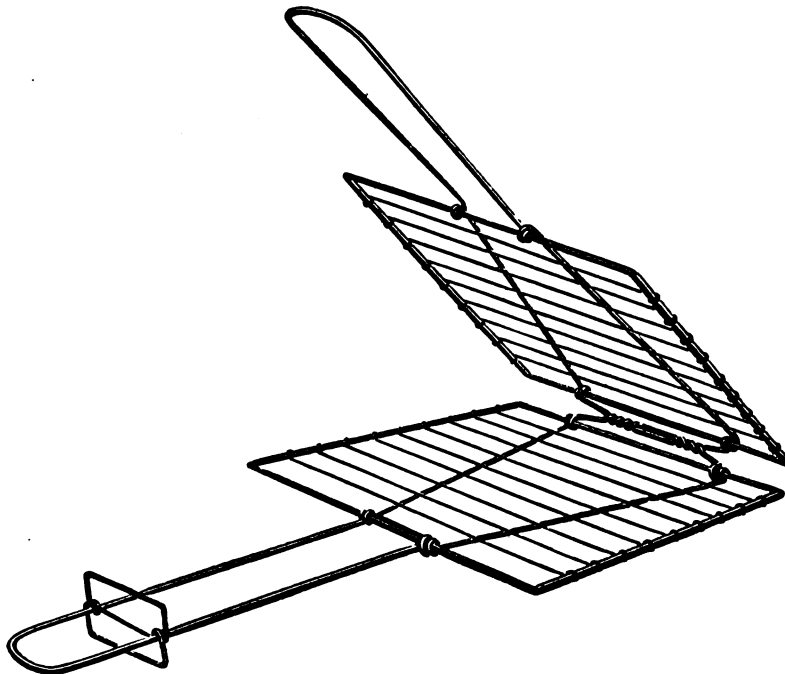
Cutlery and scissors, excepting where it is absolutely necessary to expose them, as in the window, should be kept under glass cases laid upon the counter or, where these are not available, in drawers. Electro-plated goods should always be placed with due regard to light, and may often be made to give a light and cheerful appearance to an otherwise dark corner of the shop. They should always be kept in air-tight and dust-proof cases, as otherwise, unless the sale be very rapid, they will be the source of endless trouble, and considerably depreciate in value. Copper and planished tin goods should be allowed to remain in their original paper, except those examples required for exhibition, and these last should be always, where possible, sold first, and replaced with others fresh from the paper. Great care is required in the treatment of the finer qualities of japanned goods, as they are peculiarly susceptible to the action of air and gas. The display of these should be limited in point of quantity and duration of exposure, and the bulk of stock should always be kept most carefully in the softest tissue, and be contained in cupboard or drawers. Fenders are perhaps best shown in some of the numerous racks which have been introduced for that purpose, and fire-irons, always well and cleanly oiled, as far as possible should be exhibited in an upright position in a dust-proof case, or, where a case is not available, in properly made bags. For the purpose of effectively showing fenders it is desirable to have a fairly good register stove with a medium quality marble or slate mantelpiece, in some well-lighted position, with a fender and set of fire-irons in position. This renders it possible to exhibit any fender required in such a position that the customer sees at once its suitability in point of taste or style for the purpose required. The general position to be occupied by glass cases must be determined by considerations of shape and dimensions of shop, the question of light, &c. The great points to be attained are—to make an effective display of stock without incurring more depreciation from exposure than is absolutely necessary, and to have the bulk so placed that it is at any moment available. It is entirely useless to continue month after month the exhibition of samples which have been exposed until all their original freshness and gloss have been removed, and the only sensible and business-like plan is to make a point of selling from the exposed stock and of replacing it with new. This system will have the double effect of minimizing the depreciation of stock, and, what is hardly less important, insure a continual change in the character of the stock exposed, and so produce a more effective general result.

The New Haven Broiler and Toaster.

This article is shown in the illustration given below, and is manufactured by the New Haven Wire Goods Company, New Haven, Conn., who call attention to the new principle on which it is constructed. Instead of using a ring or link to connect the two parts they use their patent hinge, thus giving a special strength where other

the South or West will soon be built and will hold 1,500,000 feet of gas. The holder will be supported by columns 110 feet in height, and the receptacle itself will be 105 feet high and nearly 140 feet in diameter. The contract for this large vessel is not yet let, although the excavation is made and the foundation walls are nearly completed, requiring 1,700,000 brick to build it. The gas company, be-

in position securely locks and holds all parts together. The lid is dome-shaped, and readily admits of good sized cups or dishes to rest in the top section. The very best material, we are informed, is employed in the construction of this article, and the manufacturers offer it to the trade in the confident expectation that it will supply a requirement which has existed for a long time past.



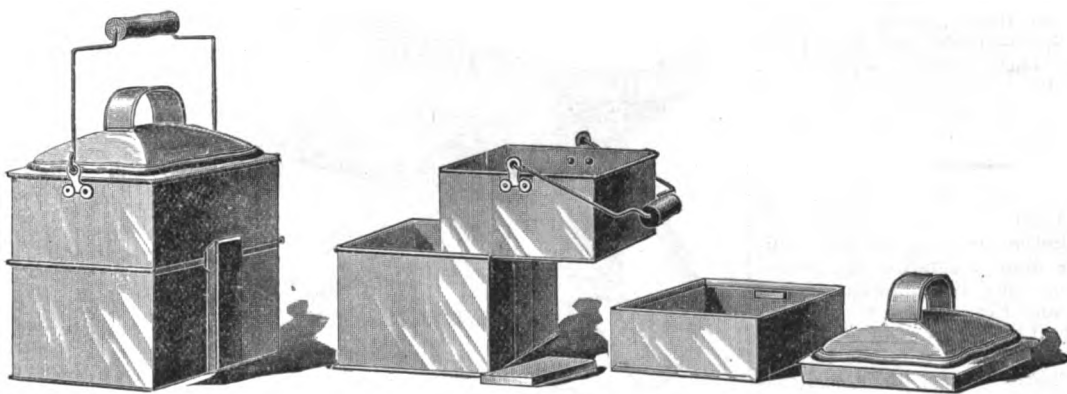
The New Haven Broiler and Toaster.

broilers are found to be weak. It will also be seen that the bars of these broilers, instead of running lengthwise, as in other broilers, extend crosswise, and being supported on the back by the heavy handle wires, which run the whole length, are kept from bending and remain in shape. To guard against the cross bars getting out of position or becoming loose a heavy tin ferrule is put between each and the next bar. The point is made that owing to the peculiar construction of the hinge joint these broilers when reversed can be shut perfectly close, or adapted to any thickness, thus making a perfect toaster.

sides providing amply for the city's wants in illuminating gas, propose to furnish water-gas for manufacturing and heating, at a cost of about 50 cents per 1000 feet. Geo. W. Morris, formerly of the firm of Geo. S. Moore & Co., pig iron, is president of the gas company and Mr. Hite Barrett is engineer.

The Picnic Dinner Pail.

The Ohio Tin and Copper Company, of Findlay, Ohio, are introducing to the trade a form of dinner pail or can as it is sometimes called, a general view of which



The Picnic Dinner Pail.

Their strength and durability, as well as the advantages alluded to above, are the points which are emphasized by the company. These broilers are made in six sizes, all of which are 9 inches in length and range in width from 6 to 13½ inches.

The Louisville Gas Company are spending several hundred thousands of dollars in increasing their facilities for making and storing gas. The improvements now going on are being built in the southern part of the city, where the largest gas receiver in

is afforded by the illustration presented herewith. By reference to the cut it will be seen that the pail is made of an upper and lower section and a tray. The top slides upon the bottom section in much the same manner as a drawer operates, the tray resting in the bottom section which forms the receptacle for tea, coffee or other liquids. The manufacturers direct particular attention to the fact that the slides are made of XXXX tin, and therefore is strong and durable. The knife and fork box is removable when desired, and when

extinguished when desired. The alcohol is placed in a metal cup, which is suspended in the frame, as shown in Fig. 1, the tubes shown being open at both ends, and no wick or packing material being required. In using the stove the alcohol is poured into the cup and the vapor lighted, and it is claimed that the combustion produces a draft of air up through the tubes, which causes an intense heat,

Queen Spirit Stove.

This article is illustrated in the cuts herewith given, and is put on the market by Silver & Co., 56 Warren street, New

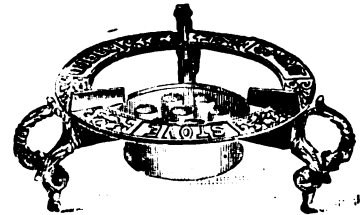


Fig. 1.—The Queen Spirit Stove.

York, Fig. 1 representing the stove proper, and Fig. 2 the regulator and extinguisher, by means of which the amount of heat given by the stove can be graduated according to circumstances and the stove

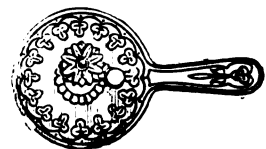


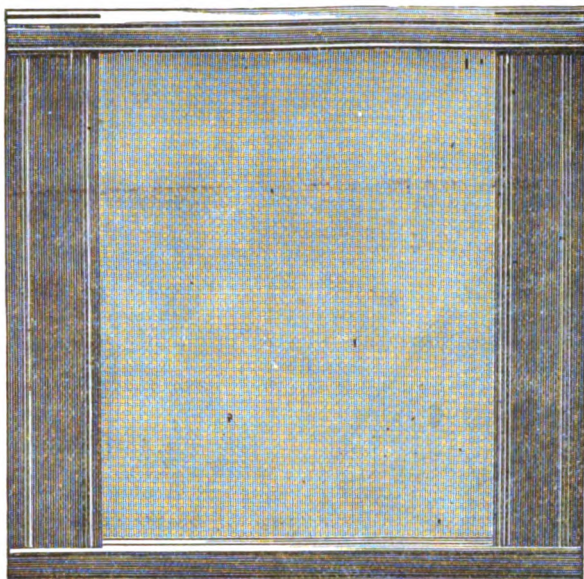
Fig. 2.—Regulator and Extinguisher.

Cormack & Co., importers of iron ore, formerly of 231 New street, New York, have transferred their business to Duluth,

Minn., having opened offices at 21 West Seventh avenue. They will give their attention to the domestic ore business.

The Bonanza Adjustable Window Screen.

This screen, manufactured by A. J. Phillips & Sons, Fenton, Mich., is represented in the accompanying illustration.



The Bonanza Adjustable Window Screen.

As will be inferred from the cut, this frame has two movable wings $3\frac{1}{2}$ inches wide, one on each side of the frame, by which means it is adjusted to windows of different widths. The proper movement of these wings is controlled by slides top and bottom, which are covered by the caps the whole length of the frame, the slides being thus entirely concealed, making a plain and unbroken front and back. Both the wings and the frame are beaded on both sides. The screens are made of bass wood, well finished and dipped in oil, thus showing the grain of the wood. The Cortland wire cloth of standard mesh and quality is used. The manufacturers advise us that their object is to produce a well made article at a lower price than they can offer their hard wood line of screens. Three sizes of these screens are made: No. 10, 20 inches high, and No. 11, 24 inches high, both of which adjust from 24 to 30 inches in width, and No. 12, 24 inches high, which adjusts from 30 to 36 inches in width.

A pipe line connecting St. Louis with the Lima, Ohio, and Pennsylvania oil fields, via Chicago, is one of the probabilities of the ensuing 12 months. It is stated that the increasing consumption of fuel oils in St. Louis, through the introduction of improved oil burners for furnaces, had decided the Standard to continue its pipe line from Chicago to St. Louis, and that the pipe will be laid next spring. For an oil pipe line the best wrought-iron pipe is used. It must be capable of resisting a pressure of 3000 pounds, as the oil is forced up long and steep grades. The size used in other pipe lines is 8 inches in inside diameter. It costs about \$1 per linear foot, or over \$5000 per mile, and the cost of laying it is fully \$1000 per mile.

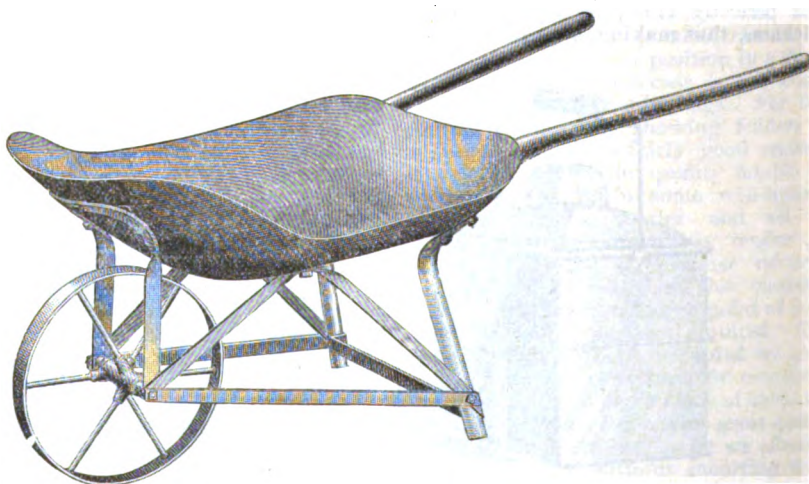
The work of dredging Gedney Channel, in New York Harbor, also Buttermilk Channel and Raritan Bay, has made good progress during the summer. The first mentioned is the most important, as the work includes dredging a channel 1000

feet wide and 30 feet deep at mean low water, extending from the deep water below the Narrows, through the main ship channel to deep water outside. The estimated cost of dredging the channel is \$1,490,000, but the total expense of the improvement, should the building of the contraction works be necessary, will be between \$5,000,000 and \$6,000,000. Up to the beginning of last month nearly 800,000 cubic yards had been removed.

The dredges have secured a channel across the shoals nearly 650 feet wide and of sufficient depth to allow the largest steamships to pass at low water. To complete the improvements at Hell Gate the next Congress will be asked to appropriate \$1,000,000.

Solid Steel Tray Wheelbarrow.

This wheelbarrow is made by the American Steel Scraper Co., Sidney, Ohio. It is represented in the accompanying illustration.



Solid Steel Tray Wheelbarrow.

tration. It has, as will be seen, a metal frame and the tray is made from one plate of steel. The wheel has a wrought iron rim $1\frac{1}{2}$ inches wide, with heavy steel spokes headed and shouldered at each end, which adds greatly to the strength of the wheel, without materially increasing its weight. It is referred to as especially adapted to mining and for use about furnaces and foundries, for mortar, or for handling dirt. The point is made that there is no wood to warp, split or get

water soaked, while the barrow is light to handle, strong, thoroughly braced and durable.

Coast Defenses and Cruisers.

The bill providing for coast fortifications introduced by Mr. Chipman, of Michigan, in the House, authorizes the Secretary of War to cause to be constructed two submerged turreted torpedo forts armed with two 16-inch rifled cannon, two pneumatic torpedo throwers, and six locomotive submerged torpedo guns, and, with two cable lines of torpediums for the protection of New York Harbor, to be placed, one on the shore side in 3 fathoms of water on Sandy Hook side, and one on the opposite side of the channel. Two similar forts are provided at each of the ports of Boston, Charleston and San Francisco. Of those at the latter point one fort shall be situated at Lime Point and one at Fort Point. The forts shall be built for the sum not exceeding \$2,000,000 each, exclusive of armaments. This shall include a sum of \$50,000 as a royalty for the exclusive use of the inventions of William M. McCarty. An appropriation of \$4,000,000 is made.

Mr. Chipman also introduced a bill authorizing the Secretary of the Navy to cause to be constructed one steel armored submerging cruiser of about 8000 tons displacement, provided with three-bladed screws, and of a speed not less than 22 knots per hour. The cruiser shall be armed with two 12-inch high powered rifled guns, four 10-inch rifled guns and a suitable secondary battery, and shall be provided with four torpedo tubes. The cruiser shall cost, exclusive of armament, a sum not to exceed \$4,000,000, the whole sum being appropriated by the bill.

In reply to the statement of the Interstate Commission's report that the operation of the law was generally beneficial to railroads, the *Railroad Gazette* shows the decline in the price of shares since the law went into effect. In New York 46 stocks have declined in value \$221,000,000 and five have risen in value \$4,750,000. The total par value of the stocks mentioned is \$1,500,000,000. The shares showing the

greatest loss are: The Atchison, \$39,000,000; Chicago, Burlington and Quincy, \$26,750,000; St. Paul, \$16,750,000; Missouri Pacific, \$17,250,000; Rock Island, \$12,000,000; Denver, \$5,750,000; Chicago and Northwestern, \$7,750,000; Missouri, Kansas and Texas, \$9,500,000, and Richmond Terminal, \$7,500,000. That these losses have been due entirely to the Interstate bill would be hard to prove, but the *Gazette* argues that this is the case.

CURRENT HARDWARE PRICES.

DECEMBER 12, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Percussion, 1000—

Black & Goldmark's	
F. L. Waterproof, 1-10's	50¢
R. B. Trimmer Edge, 1-10's	50¢
R. B. Ground Edge, Central Fire, 1-10's	75¢
Double Waterproof, 1-10's	50¢
Musket Waterproof, 1-10's	50¢
G. D.	38¢
S. B.	30¢

Union Metallic Cartridge Co.

F. C. Trimmer	50¢
F. L. Ground	50¢
Gen. Fire Ground	70¢
Double Waterproof	75¢
Double Waterproof, in 1-10's	1.40
S. B. Genuine Imported	45¢
Eley's D. B.	54¢
Eley's D. Waterproof, Central Fire	1.60

Cartridges—

Rim Fire Cartridges	dis 60¢ & 2¢
Rim Fire Military	dis 15¢ & 2¢
Central Fire, Pistol and Rifle	dis 25¢ & 2¢
Central Fire, Military & Sporting	dis 15¢ & 2¢
Blank Cartridges, except 22 and 33 cal., an additional 10¢ over above discounts	
Blank Cartridges, 22 cal.	\$1.75, dis 2¢
Blank Cartridges, 33 cal.	\$3.50, dis 2¢
Primed Shells and Bullets	dis 15¢ & 2¢
R. B. Caps, Round Ball	1.75, dis 2¢
R. B. Caps, Conical Ball, Swaged	2.00, dis 2¢

Primers—

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells)	\$1.00, dis 2¢
All other Primers, all sizes	\$1.20, dis 2¢

Shells—

First quality, 4, 8, 10 and 12 gauge	dis 25¢ & 10¢ & 2¢
First quality, 14, 16 and 20 gauge (\$10 list)	dis 35¢ & 10¢ & 2¢
Star, Club, Rival and 10 gauge, \$0 list	dis 35¢ & 10¢ & 2¢
Climax Brands, 12 gauge, \$8 list	dis 35¢ & 10¢ & 2¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 35¢ & 10¢ & 2¢
Seibold's Combination Shot Shells	dis 15¢ & 2¢
Brass Shot Shells, 1st quality	dis 60¢ & 2¢
Brass Shot Shells, Club, Rival, Climax	dis 65¢ & 2¢
A. B. & C. Co., 10 & 12 gauge	dis 40¢ & 2¢
A. B. & C. Co., "Special," 16 gauge	dis 30¢ & 10¢ & 2¢
A. B. & C. Co., "Special," 10 & 12 gauge	dis 40¢ & 10¢ & 2¢
Fowler's Patent, 10 & 12 gauge, \$100	\$3.75

Shells Loaded—

List No. 19 1887	dis 20¢ & 10¢
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Wads—

U. M. C. & W. R. A.—B. E., 11 up	\$2.00
U. M. C. & W. R. A.—B. E., 9&10	2.50
U. M. C. & W. R. A.—B. E., 7&8	2.50
U. M. C. & W. R. A.—P. E., 11 up	3.10
U. M. C. & W. R. A.—P. E., 9&10	4.00
U. M. C. & W. R. A.—P. E., 7&8	4.90
Eley's B. E., 11 up	1.75
Eley's P. E., 11 & 20	\$2.50

Anvils—

Eagle Anvil	\$100, dis 20¢ & 20¢ & 5¢
Peter Wright's	94¢
Armstrong's	94¢
Armstrong House Hole, Extra	1.15
Trenton	1.15
Wilkinson's	94¢
J. & Riley Carr. Patent Solid	1.15

Anvil Vise and Drill—

Millers Anvil Co.	\$15.00, dis 20¢
Cheney Anvil and Vise	dis 35¢
Allen Combined Anvil and Vise	\$3, dis 40¢ & 10¢
Moore & Barnes Mfg. Co.	dis 38¢ & 4¢

Apple Parers.

Advance	\$ doz. \$1.75
Antrim Combination	\$ doz. 5.50
Baldwin	\$ doz. 5.25
Champion	\$ doz. 7.25
Eureka, 1888	each 17.00
Family Bay State	\$ doz. 12.00
Gem	\$ doz. 5.25
Gold Medal	\$ doz. 4.00
Hudson's New 88	\$ doz. 3.75
Ideal	\$ doz. 4.75
Improved Bay State	\$ doz. 30.00
Little Star	\$ doz. 5.00
Monarch	\$ doz. 13.50
New Lightning	\$ doz. 5.50
Orion	\$ doz. 4.00
Pen	\$ doz. 4.00
Perfection	\$ doz. 4.00
Pomona	\$ doz. 4.00
Rocking Table	\$ doz. 6.00
Turntable	\$ doz. 4.50
Victor	\$ doz. 13.50
Waverly	\$ doz. 4.50
White Mountain	\$ doz. 4.50
72	\$ doz. 4.25
78	\$ doz. 5.75
78	\$ doz. 6.50

Augers and Bits.

Douglas Mfg. Co.	
Wm. A. Ives & Co.	
Humphreysville Mfg. Co.	dis 70¢
French (Swift & Co. F. H. Beecher)	
Cook's, Douglas Mfg. Co.	dis 55¢
Cook's, New Haven Copper Co.	dis 50¢ & 10¢ & 50¢ & 10¢ & 50¢
Ives' Circular	dis 60¢
Patent Solid	dis 30¢
O. E. Jennings & Co., No. 10, extension 10	dis 40¢
O. E. Jennings & Co., No. 30	dis 60¢
O. E. Jennings & Co., Auger Bits, in fancy boxes, set, 32½ quarts, No. 5, 35; No. 30, 32	dis 20¢
Lewis' Patent Single Twist	dis 45¢
Russell Jennings' Augers and Bits	dis 25¢
Imitation Jennings' Bits	dis 60¢ & 30¢
Pugh's Black	dis 15¢ & 10¢
Car Bits	dis 50¢ & 10¢ & 30¢
L'Hommedieu Car Bits	dis 15¢ & 10¢
Forstner Pat. Auger Bits	dis 10¢

Blow Augers—

Ives	
French, Swift & Co.	dis 25¢ & 10¢
Douglas	dis 25¢ & 10¢
Bonney's Adjustable	dis 40¢ & 10¢
Stearns	dis 20¢ & 10¢
Ives' Expansive, each \$2.50	dis 20¢
Universal Expansive, each \$4.50	dis 20¢
Wood's	dis 25¢ & 35¢ & 10¢

Expansive Bits—

Clark's small, 118; large, 220	dis 35¢ & 55¢ & 5¢
Ives' No. 4, per doz.	dis 35¢ & 40¢
Swan's	dis 40¢
Stearns' No. 1, 32; No. 2, 32	dis 35¢
Stearns' No. 3, 48	dis 30¢

Steel Bits—

Common	\$ gross \$2.75 @ \$3.25
Diamond	\$ doz. \$1.10, dis 25¢ & 10¢
"Bee"	dis 35¢ & 25¢ & 5¢
Double Cut, Shepardson's	dis 45¢ & 45¢ & 5¢
Double Cut, C. V. Valley Mfg. Co.	dis 30¢ & 10¢
Double Cut, Hartwell's	dis 45¢
Double Cut, Donkias	dis 40¢ & 10¢
Double Cut, Ives	dis 60¢ & 60¢ & 5¢

Bit Stock Drills—

Morse Twist Drills	dis 50¢ & 10¢ & 5¢
Standard	dis 50¢ & 10¢ & 5¢
Cleveland	dis 50¢ & 10¢ & 5¢
Syracuse, for metal	dis 50¢ & 10¢ & 5¢
Syracuse, for wood (wood list)	dis 30¢ & 80¢ & 5¢
Williams or Holt's, for metal	dis 50¢ & 10¢ & 5¢
Williams or Holt's, for wood	dis 40¢ & 10¢

Ship Augers and Bits—

L'Hommedieu's	dis 15¢ & 10¢ @ 15¢ & 10¢ & 5¢
Watrous's	dis 15¢ & 10¢ @ 15¢ & 10¢ & 5¢
Snell's	dis 15¢ & 10¢ @ 15¢ & 10¢ & 5¢
Snell's Ship Auger Pat'n Car Bits	dis 15¢ & 10¢ @ 15¢ & 10¢ & 5¢

Awl Hints.

Sewing, Brass Ferrule	\$3.50 \$ gross—dis 45¢ & 10¢
Patent Sewing, Short	\$1.00 \$ doz—dis 40¢ & 10¢
Patent Sewing, Long	\$1.20 \$ doz—net
Patent Peg, Plain Top	\$10.00 \$ gross—dis 45¢ & 10¢
Patent Peg, Leather Top	\$12.00 \$ gross—dis 45¢ & 10¢

Awls, Brad Sets, &c.

Awls, Sewing, Common	\$ gross \$1.70—dis 35¢
Awls, Shouldered Peg	\$ gross \$2.45—dis 40¢ & 10¢
Awls, Patent Peg	\$ gross \$3.45—dis 40¢ & 10¢
Awls, Shouldered Brad	\$2.70 \$ gross—dis 35¢
Awls, Handled Brad	\$7.50 \$ gross—dis 45¢
Awls, Handled Scratch	\$7.50 \$ gross—dis 35¢ & 10¢
Awls, Socket Scratch	\$1.50 \$ doz—dis 25¢ & 30¢

Awls and Tool Sets.

Allen's Sets, Awls & Tools, No. 30	\$10.00—dis 65¢ & 10¢
Tray's Ad Tool Hds., Nos. 1, 12; 2, 12; 3, 12; 4, 12	dis 25¢ & 25¢ & 10¢
Willer's Falls Ad Tool Hds., Nos. 1, 12; 2, 12; 3, 12; 4, 12	dis 25¢ & 25¢ & 10¢
Henry's Combination Haft	dis 25¢
Brad Sets, No. 42, \$10.50, No. 48, \$12.50, No. 50, \$12.50	dis 70¢ & 10¢ & 5¢
Brad Sets, Stanley's Excelsior, No. 1, \$7.50	dis 30¢ & 10¢
Brad Sets, Stanley's Excelsior, No. 2, \$4.00	dis 30¢ & 10¢
Brad Sets, Stanley's Excelsior, No. 3, \$5.50	dis 30¢ & 10¢

Axes.

Mahers' and Special Brands—	
First quality	\$ doz. \$6.00 @ \$6.50
Others	\$ doz. \$5.50 @ \$5.75

Axle Grease.

Fraser's, in bulk	Keg \$1.40; Fall, \$1.50 net
Fraser's, in boxes	\$ doz. \$9.50
Dixon's Everlasting, in 10 lb. pails	\$1.20; 3, \$3.25
Dixon's Everlasting, in 10 lb. pails, each	\$2.50
Lower grades, special brands	\$ gross \$5.50 @ \$7

Axles—

No. 1, 4¢ @ 4¢; No. 2, 5¢ @ 5¢	
No. 7 to 18	dis 50¢ & 55¢
No. 19 to 22	dis 60¢ & 10¢ & 10¢ & 70¢
National Wrought Steel Tubular Self-Oiling Standard Farm (1 to 5) and Special Farm (A1 to A5)	dis 35¢
Over 10 sets	dis 35¢ & 45¢
I Strong Exp. (5 to 9), & XX Strong Truck (10 to 15)	dis 10¢
Less than 10 sets	dis 10¢ & 5¢
Over 10 sets	dis 10¢ & 5¢

Bag Holders.

Sturges's Pat.	\$ doz \$18
Gallegos—Spring Balances	dis 60¢
Common 24"	dis 60¢
Chattillon's Spring Balance	\$ doz, \$1.50—dis 60¢
Chattillon's Circular Spring Balance	dis 60¢

Bells.

Light Brass	dis 70¢ & 10¢
White Metal	dis 60¢ & 10¢
Alloy Brass	dis 60¢ & 10¢
Globe (Cone's Patent)	dis 25¢ & 10¢ @ 35¢

Door.

Gong, Abbe's	dis 35¢ & 10¢
Long, Yankee	dis 45¢ & 10¢
Long, Barton's	dis 40¢ & 10¢
Morris' Taylor	dis 25¢ & 10¢
Frank, Brooks	dis 50¢ & 10¢ & 5¢
Frank, Cone's	dis 30¢ & 10¢
Frank, Connell's	dis 30¢ & 10¢
Lever, Sargent's	dis 60¢ & 10¢
Lever, Taylor's Bronzed or Plated	dis 35¢ & 10¢
Lever, Taylor's Japanned	dis 35¢ & 10¢
Lever, R. W. Co's	dis 50¢ & 10¢ & 5¢
Pull, Brook's	dis 50¢ & 10¢ & 5¢
Pull, Western	dis 25¢ & 10¢

Cow.

Common Wrought	dis 60¢ & 10¢
Western, Sargent's list	dis 70¢ & 10¢
Kentucky, Sargent's list	dis 70¢ & 10¢
Dodge, Genuine Kentucky, new list	dis 70¢ & 10¢
Star	dis 50¢ & 10¢ @ 50¢ & 10¢ & 5¢
Call	dis 40¢ & 10¢ & 5¢
Steel Alloy Church and School Bells	dis 40¢
Bellows—Blacksmiths	dis 60¢ & 10¢ @ 60¢
Hand Bellows	dis 40¢ & 10¢ @ 40¢
Belting, Rubber	dis 40¢ & 10¢ @ 40¢

Common Standard.

Standard	dis 70¢ & 10¢
Extra	dis 60¢ & 10¢ @ 60¢
N. Y. & E. Co., Standard	dis 40¢ & 5¢
N. Y. & E. Co., Extra Standard	dis 50¢ & 10¢

Blind Staps.

Morrill's	\$ doz \$5.00—dis 50¢
Hutchins's	\$ doz \$5.00—dis 10¢ & 10¢
Weston's, per doz No. 1, \$10; No. 2, \$9	dis 25¢ & 10¢ & 5¢
McGill's	\$ doz \$3—dis 10¢

Bits—Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.

Extension, Barber's	\$ doz \$15.00—dis 40¢ & 10¢
Extension, Ives	\$ doz \$30.00—dis 60¢ & 10¢
Diagonal	\$ doz \$24.00—dis 40¢
Angular	\$ doz \$24.00—dis 40¢ & 5¢
Blind Adjusters	\$ per doz \$3.00—dis 35¢
Excelsior	\$ doz \$10.00—dis 50¢ & 10¢ & 5¢
Washburn's Self-Locking	dis 20¢ & 30¢ & 10¢

Blind Fasteners.

Mackrell's	\$ doz pairs, \$1.00—dis 30¢ & 10¢ & 5¢
Van Sand's Screw Pattern	dis 15¢ \$ gross—dis 50¢ & 10¢
Van Sand's Old Pattern	dis 15¢ \$ gross—dis 50¢ & 10¢
Washburn's Old Pattern	dis 30¢ \$ gross, net
Merriman's	dis 30¢ \$ gross, net
Austin Eddy, No. 3008	dis 30¢ \$ gross, net
Security Gravity	dis 30¢ \$ gross, net

Blind Staples.

Barbed, 1/4 in. and larger	\$ doz \$7.40 @ \$8 net
Barbed, 1/4 in.	\$ doz \$7.40 @ \$8 net

Stocks.

Cleveland Block Co., Mal. Iron	dis 50¢
Novelty Tackle Blocks, Mal. Iron	dis 50¢

Bells.

Door and Shutter—	
Cast Iron Barrel, Square, &c.	dis 70¢ & 70¢ & 10¢
Cast Iron Shutter Bolts	dis 70¢ & 70¢ & 10¢
Cast Iron Chain (Sargent's list)	dis 65¢ & 10¢
Ives' Patent Door Bolts	dis 60¢
Wrought Square	dis 70¢ & 70¢ & 10¢
Wrought Square	dis 70¢ & 70¢ & 10¢
Wrought Square, all Iron, Stanley's list	dis 60¢ & 10¢
Wrought Shutter, Brass Knob, Stanley's list	dis 40¢ & 10¢
Wrought Shutter, Sargent's list	dis 60¢ & 10¢
Wrought Sunk Flush, Sargent's list	dis 55¢ & 10¢
Wrought Sunk Flush, Stanley's list	dis 50¢ & 10¢
Wrought Sunk Flush, Stanley's list	dis 50¢ & 10¢

Carriage.

Com. list June 10, '84	dis 75¢ & 24¢ & 2¢
Genuine Eagle, list Oct. '84	dis 75¢ & 10¢
Phila. pattern, list Oct. 7, '84	dis 75¢ & 10¢ & 5¢
R. B. & W. old list	dis 70¢

Common, list Feb. 28, 1888.

P. C. B. & N. Co., Empire, list Feb. 28, 1888	dis 70¢
P. C. B. & N. Co., Philadel., list Oct. 84	dis 70¢
P. C. B. & N. Co., Keystone, Phil. list Oct. '84	dis 80¢
P. C. B. & N. Co., Norway, Phil. list Oct. '84	dis 75¢ & 10¢
Am. S. Co., Norway, Phil. list Oct. '84	dis 75¢ & 10¢
Am. S. Co., Ragis, Phil. list Oct. '84	dis 80¢
Am. S. Co., Philadel., list Oct. 16, '84	dis 80¢
Am. S. Co., Philadel., list Feb. 28, '85	dis 70¢
R. B. & W., Philadel., list Oct. 16, 1884	dis 70¢
R. & E. Mfg. Co.	dis 70¢

Stove and Plow.

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Pennsylvania.....dis 40x10%
Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
Kilgus' Challenge, Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
Home No. 1.....dis 40x10%
Draw Cut, Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
Beef Shavers.....dis 40x10%
Chadborn's Smoked Beef Cutter.....dis 40x10%
Winning Knives.....dis 40x10%
Am. (3d quality), 7 gro, 1 blade, 77; 2 blades, 112; 3 blades, 118.....dis 40x10%
Lothrop's.....dis 40x10%
Smith's, 7 gro, Single, \$2.00; Double, \$3.....dis 40x10%
Knapp & Cowles.....dis 40x10%
Buffalo Adjustable.....dis 40x10%
Hessians Gates-Stebbins' Pat. dis 70x70 & 71x71
Stebbins' Genuine.....dis 60x10x10%
Stebbins' Tinned Ends.....dis 40x10%
Chase's Hard Metal.....dis 40x10%
Bush's.....dis 40x10%
Lincoln's Pattern.....dis 70 & 70x10%
Wood's.....dis 40x10%
Boss Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
Money Drawers.....dis 40x10%
Muzzies-Safety, 7 gro, \$15 @ \$20.....dis 25 %
Nails.....dis 40x10%
Wire Nails & Brads, List July 14, '87, dis 70x10%
Wire Nails, Standard Penny.....dis 40x10%
Nail Puller-Curtiss Hammer.....dis 40x10%
Giant, No. 1.....dis 40x10%
Pelican.....dis 40x10%
Lightning.....dis 40x10%
Nail Meters-Square.....dis 40x10%
Round.....dis 40x10%
Cannon's Diamond Point.....dis 40x10%
Nail Cracks.....dis 40x10%
Table Hammer, Beckley Mfg. Co.....dis 40x10%
Blake's Pattern.....dis 40x10%
Turner & Seymour Mfg. Co.....dis 40x10%
Nuts, off list Jan. 1, 1888.....dis 40x10%
Hot Pressed.....dis 40x10%
Cold Punched.....dis 40x10%
In lots less than 100 lb, 1 lb, add 1/4, 1 lb boxes add 1/2 to list.
O Government.....dis 40x10%
U. S. Navy.....dis 40x10%
Navy.....dis 40x10%
Officers-Zinc and Tin.....dis 40x10%
Brass and Copper.....dis 40x10%
Malleable, Hammer, Improved, No. 1, \$3.00, dis 40x10%
\$4.00; No. 3, \$4.40; dis 40x10%
Malleable, Hammer, Old Pattern, same list, dis 40x10%
Prior's Patent or "Paragon" Zinc.....dis 40x10%
Prior's Patent or "Paragon" Brass.....dis 40x10%
Olmstead's Tin and Zinc.....dis 40x10%
Olmstead's Brass and Copper.....dis 40x10%
Broughton's Zinc.....dis 40x10%
Broughton's Brass.....dis 40x10%
Packing, Steam.....dis 40x10%
Standard.....dis 40x10%
Extra.....dis 40x10%
N. Y. B. & P. Co., Standard.....dis 40x10%
N. Y. B. & P. Co., Empire.....dis 40x10%
N. Y. B. & P. Co., Salamander.....dis 40x10%
Jenline's Standard.....dis 40x10%
Miscellaneous.....dis 40x10%
American Packing.....dis 40x10%
Russia Packing.....dis 40x10%
Italian Packing.....dis 40x10%
Cotton Packing.....dis 40x10%
Jute.....dis 40x10%
Padlocks-See Locks.
Pails.....dis 40x10%
Galvanized Iron.....dis 40x10%
Quarts.....dis 40x10%
Hill's Light Weight, 7 gro.....dis 40x10%
Hill's Heavy Weight, 7 gro.....dis 40x10%
Whiting's.....dis 40x10%
Sidney Shepard & Co.....dis 40x10%
Iron Clad.....dis 40x10%
Fire Buckets.....dis 40x10%
Rockets, see Wall Rockets
Indurated Fibre Ware.....dis 40x10%
Star Pails, 12 qt.....dis 40x10%
Fire Stable and Milk, \$5.00
Faber's Faber's Carpenters.....dis 40x10%
Faber's Round Gilt.....dis 40x10%
Dixon's Lead.....dis 40x10%
Dixon's.....dis 40x10%
Dixon's Carpenters.....dis 40x10%
Picks.....dis 40x10%
Ballroad, 5 to 6, \$12.00; 6 to 7, \$13, dis 40x10%
Adze Eye, 5 to 6, \$12.00; 6 to 7, \$12, dis 40x10%
Picture Nails.....dis 40x10%
Brass Head, Sargent's list.....dis 40x10%
Brass Head, Combination list.....dis 40x10%
Porcelain Head, Sargent's list.....dis 40x10%
Porcelain Head, Combination list.....dis 40x10%
Wiles' Patent.....dis 40x10%
Plating Iron.....dis 40x10%
Pipe, Wrought Iron-List March 23, 1887, 1/4 and under, Plain.....dis 40x10%
1/4 and under, Galvanized.....dis 40x10%
1/4 and over, Plain.....dis 40x10%
1/4 and over, Galvanized.....dis 40x10%
Boiler tubes, iron.....dis 40x10%
Flanges and Flange Irons.....dis 40x10%
Moldings.....dis 40x10%
Bench, First Quality.....dis 40x10%
Bench, Second Quality.....dis 40x10%
Bailey's (Stanley R. & L. Co.).....dis 40x10%
Iron Planes.....dis 40x10%
Bailey's (Stanley R. & L. Co.), dis 30x10 @ 30x10x5 %
Miscellaneous Planes (Stanley R. & L. Co.), dis 20x10 %
Victor Planes (Stanley R. & L. Co.), dis 20x10 %
Steers Iron Planes.....dis 40x10%
Meriden Mal. Iron Co's.....dis 30x10 @ 30x10x5 %
Davis's Iron Planes.....dis 30x10 @ 30x10x5 %
Birmingham Plane Co.....dis 40x10x5 %
Gage Tool Co's Self Setting.....dis 2 & 3 1/2 %
Chaplin's Iron Planes.....dis 40 & 40x5 %
Sargent's.....dis 30x10 @ 30x10x5 %
Plane Irons.....dis 20x10 %
Plane Irons, Butcher's.....dis 20x10 %
Plane Irons, Buck Bros.....dis 30x10 %
Plane Irons, Auburn Tool Co., "Thistle".....dis 40 %
Sandusky Tool Co.....dis 40x10 %
Single and Cut.....dis 30 %
Double.....dis 40 %
L. & J. White.....dis 25 %
Pliers and Nippers.....dis 30x10 @ 40 %
Button's Patent.....dis 30x10 @ 40 %
Hall's Pat. Compound Lever Cutting Nippers, No. 7, 5 in., \$13.50; No. 4, 7 in., \$21.00; dis 40x10 %
Wummann & Beckley Mfg. Co.....dis 50x10x5 %
Gas Pliers.....dis 40 %
Gas Pliers, Custer's Nickel Plated.....dis 40x5 %
Eureka Pliers and Nippers.....dis 40 %
Russell's Parallel.....dis 25 %
F. S. & W. Cast Steel.....dis 50 %
F. S. & W. Tinner's Cutting Nippers.....dis 40 %
Carew's Pat. Wire Cutters.....dis 20 %
Morrill's Parallel, per doz., \$12.....dis 30x5 %
Gong's 8 in., \$15; 10 in., \$21.....dis 40 @ 40x5 %

Plumbers and Levels.....dis 70x10 @ 70x10x10 %
Regular List.....dis 45x10 %
Diaston's.....dis 70x10 @ 70x10x10 %
Pocket Levels.....dis 30 %
Davis Iron Levels.....dis 10x10 %
Davis' Inclino-meters.....dis 10x10 %
Poppers, Cern.....dis 12 @ \$15
Round or Square, 3 qt.....dis 12 @ \$15
Round or Square, 3 qt.....dis 12 @ \$15
Feet Hole and Tree Augers and Diggers.....dis 30x10 %
Samson Post Hole Digger.....dis 30x10 %
Fletcher Post Hole Augers.....dis 30x10 %
Eureka Diggers.....dis 16 @ \$17
Lead's.....dis 8 @ \$9.00
Vaughan's Post Hole Auger, per doz.....dis 13 @ \$14.00
Kohler's Little Giant.....dis 15 @ \$15.00
Kohler's Hercules.....dis 15 @ \$15.00
Kohler's New Champion.....dis 15 @ \$15.00
Schneider.....dis 15 @ \$15.00
Ryan's Post Hole Diggers.....dis 24 %
Cronk's Post Bars.....dis 50x5 @ 60x10 %
Gibb's Post Hole Digger, 7 gro, \$30.....dis 40 @ 40x10 %
Potato Parers.....dis 25 @ \$5.00 @ 5.50
White Mountain.....dis 25 @ \$5.00 @ 5.50
Antrim Combination.....dis 25 @ \$5.00 @ 5.50
Hoosier.....dis 25 @ \$5.00 @ 5.50
Pruning Hooks and Shears.....dis 20x10 %
Disaston's Combined Pruning Hook and Saw, 7 gro, \$15.00.....dis 20x10 %
Disaston's Pruning Hook.....dis 20x10 %
E. S. Lee & Co's Pruning Tools.....dis 40 %
Pruning Shears, Henry's Pat.....dis 3.75 @ \$4.00 net
Henry's Pruning Shears.....dis 4.25 @ \$4.50 net
Wheeler, M. & Co's Combination.....dis 12, dis 20 %
Dunlap's Saw and Chisel.....dis 25 @ \$30.00
J. Wallington & Co., No. 2, 7.25
Pallets-Hot House, Awnings, etc.....dis 60x10 %
Japanned Screw.....dis 60x10 %
Brass Screw.....dis 60x10 %
Japanned Slide.....dis 60x10 %
Japanned Clothes Line.....dis 60x10 %
Empire Sash Pulley.....dis 55 @ 60 %
Moore's Sash, Anti Friction.....dis 50 %
Hay Fork, Solid Eye, \$4.00; Swivel, \$5.50.....dis 50x10x5 %
Hay Fork, "Anti-Friction," 5 in. Solid, \$7.70.....dis 50 %
Hay Fork, "F" Common and Pat. Bushed.....dis 20 %
Hay Fork, Tarbox Pat. Iron.....dis 20 %
Hay Fork, Reed's Self-Lubricating.....dis 20 %
Shade Rack.....dis 45 %
Tackle Blocks.....dis 50x10 %
Pumps-Cistern, Best Makers.....dis 50 @ 10x60 %
Pitcher Spout, Best Makers.....dis 60x10 @ 60x10x10 %
Pitcher Spout, Cheaper Goods.....dis 70x5 @ 70x10x5 %
Punches.....dis 60x5 @ 65x5
Saddlers or Drive, good quality.....dis 60x5 @ 65x5
Bemis & Call Co's Cast Steel Drive.....dis 50x5 %
Bemis & Call Co's Springfield Sockets.....dis 60x5 %
Spring, good quality.....dis 25 @ \$2.50
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co's Spring and Check.....dis 40 %
Solid Tinner's.....dis 14, dis 55 %
Tinner's Hollow Punches.....dis 20x2 %
Rice Hand Punches.....dis 15 %
Avery's Revolving.....dis 30x10 %
Avery's Saw-Set and Punch.....dis 30x5 %
Rail.....dis 15 %
Sliding Door, Wrt. Brass 7 x 3 1/2.....dis 15 %
Sliding Door, Bronzed Wrt. Iron.....dis 15 %
Sliding Door, Iron, Painted.....dis 15 %
Sliding Door, Light.....dis 15 %
Per 100 feet.....dis 2.50 3.00 4.10-dis 10 %
S for N E Hangers-Small.....dis 2.15
Med. 2.70
Large 3.25 net
Terry's Wrought Iron, 7 foot.....dis 40x5 %
Victor Track Rail, 7 1/2 foot.....dis 40x5 %
Carrie's Steel Rail, per foot.....dis 40x5 %
Rakes.....dis 65 %
Cast Steel, Association goods.....dis 60x10 %
Malt, sole.....dis 70 @ 70x5 %
Gibbs Lawn Rake.....dis 12, dis 50 %
Canton Lawn Rake.....dis 30, dis 50 %
Ft. Madison Prize Bow Rake and Peeries.....dis 65 %
Fort Madison Steel Tooth Lawn Rake, \$6.....dis 25 %
Razors-J. R. Torrey Razor Co.....dis 20x5 %
Westonholme and Butcher.....dis 10 to 2, dis 10 %
Razor Strops.....dis 60 @ 60x5 %
Genuine Emerson.....dis 60 @ 60x5 %
Imitation Emerson.....dis 60 @ 60x5 %
Badger's Belt and Combination.....dis 20 %
Lamont Combination.....dis 20 %
Rivets and Burrs.....dis 50 @ 50x10 %
Copper, list November 17, 1887.....dis 50 @ 50x7 1/2 %
Rivet Sets.....dis 50x2 @ 50x10 %
Rods-Stair, Brass.....dis 20x2 %
Stair Black Walnut.....dis 40x5 %
Rollers.....dis 60x10x10 %
Barn Door, Sargent's list.....dis 60x10x10 %
Acme (Anti-Friction).....dis 50 %
Union Barn Door Roller.....dis 70 %
Ropes-Manufacturers' prices for large lots
Manila.....dis 12 1/2 @ 12 1/2 net
Manila.....dis 14 @ 14 net
Manila.....dis 16 @ 16 net
Manila Tarred Rope.....dis 12 1/2 @ 12 1/2 net
Manila Hay Rope.....dis 12 1/2 @ 12 1/2 net
Sisal.....dis 10 1/2 @ 10 1/2 net
Sisal.....dis 11 1/2 @ 11 1/2 net
Sisal Hay Rope.....dis 10 1/2 @ 10 1/2 net
Sisal Tarred Rope.....dis 10 1/2 @ 10 1/2 net
Sisal Medium Lath Yarn.....dis 9 1/2 @ 9 1/2 net
Cotton Rope.....dis 15 @ 15 net
Jute Rope.....dis 15 @ 15 net
Rules.....dis 80x10 @ 80x10x10 %
Boxwood.....dis 80x10 @ 80x10x10 %
Ivory.....dis 50 @ 50x10 %
Starrett's Rules and Straight edges, Steel, dis 25x10 %
Saw Irons.....dis 100 @ \$2.40 @ \$2.55
Self Heating.....dis 100 @ \$2.40 @ \$2.55
Self Heating, Tailors'.....dis 100 @ \$2.40 @ \$2.55
Gleason's Shield and Toller.....dis 25 %
Mrs. Pott's Irons.....dis 40 @ 40x5 %
Enterprise Star Irons, new list, July 20, 1887.....dis 40 %
Combined Fluter and Sad Iron, 7 gro, \$15.00, dis 15 %
Fox Reversible, Self Fluter.....dis 24, dis 15 %
Chinese Laundry (N. E. Butt Co.).....dis 15 %
Candell.....dis 15 %
Mahony's Troy Pol. Irons.....dis 25 %
Sensible.....dis 20 @ 20x5 %
Sane and Emery Paper and Cloth.....dis 35 @ 40 %
List April 19, 1887.....dis 35 @ 40 %
Sibley's Emery and Crocus Cloth.....dis 30 %
Sash Uerd.....dis 10 @ 11 @ 11 1/2
Common.....dis 13 @ 13 1/2 @ 13 1/2
Patent, good quality.....dis 13 @ 13 1/2 @ 13 1/2
White Cotton Braided, fair quality.....dis 25 @ 25 1/2 @ 25 1/2
Common Braided Sash.....dis 18 1/2 @ 18 1/2
Patent.....dis 15 @ 15 1/2 @ 15 1/2
Cable Laid Italian.....dis 22 @ 23 @ 23 1/2
India Cable Laid.....dis 13 @ 13 1/2 @ 13 1/2
Flat Wire, A Quality, White.....dis 10x10x5 %
Silver Lake, A Quality, Drab.....dis 10x10x5 %
Silver Lake, B Quality, White.....dis 10x10x5 %
Silver Lake, C Quality, Drab.....dis 10x10x5 %

Silver Lake, C Quality, White (only).....dis 10x10x5 %
Sylvan Spring, Extra Braided, White.....dis 10x10x5 %
Sylvan Spring, Extra Braided, Drab.....dis 10x10x5 %
Semper Idem, Braided, White.....dis 10x10x5 %
Egyptian, India Hemp, Braided.....dis 10x10x5 %
Samson, Braided, White Cotton.....dis 10x10x5 %
Samson, Braided, Drab Cotton.....dis 10x10x5 %
Samson, Braided Italian Hemp.....dis 10x10x5 %
Samson, Braided Linen.....dis 10x10x5 %
Sash Locks.....dis 10x10x5 %
Clark's No. 1, \$10.00; No. 2, \$5.00; gross.....dis 10x10x5 %
Ferguson's.....dis 10x10x5 %
Morris and Triumph, list Aug. 16, 1886.....dis 10x10x5 %
Victor.....dis 10x10x5 %
Walker's.....dis 10x10x5 %
Atwell Mfg. Co.....dis 10x10x5 %
Reading.....dis 10x10x5 %
Hammond's Window Springs.....dis 10x10x5 %
Common Sense, Jap d. Cop'd and Brased, 7 gro, \$14.00
Common Sense, Nickel Plated.....dis 10x10x5 %
Universal.....dis 10x10x5 %
Emmehall's Gravity.....dis 10x10x5 %
Emmehall's Model.....dis 10x10x5 %
Corbin's Daisy, list February 15, 1886.....dis 10x10x5 %
Payson's Perfect.....dis 10x10x5 %
Huganin's New and Improved Adjustable Sash Locks, list Jan. 5, 1887.....dis 10x10x5 %
Huganin's New Sash Locks, list Jan. 5, '87, dis 10x10x5 %
Stoddard's Practical.....dis 10x10x5 %
Ives'.....dis 10x10x5 %
Liesche's No. 100 & 110, 7 gro, \$10.00, \$10.00, dis 10x10x5 %
Davis, Bronze, Barnes Mfg. Co.....dis 10x10x5 %
Champion Safety, list March 1, 1886.....dis 10x10x5 %
Security.....dis 10x10x5 %
Sash Weights.....dis 10x10x5 %
Solid Eyes.....dis 10x10x5 %
Sausage Stuffers or Fillers.....dis 10x10x5 %
Miles' "Challenge".....dis 10x10x5 %
Perry.....dis 10x10x5 %
Draw Cut No. 4.....dis 10x10x5 %
Enterprise Mfg. Co.....dis 10x10x5 %
Saws.....dis 10x10x5 %
Diston's Circular.....dis 45 @ 45x5 %
Diston's Cross Cut, dis 45 @ 45x5 %
Diston's Hand.....dis 25 @ 25x5 %
Atkins' Circular.....dis 50 %
Atkins' Special Steel Diamond X Cuts.....dis 50 %
Atkins' Special Steel Dexter X Cuts.....dis 50 %
Atkins' Special Steel Diamond X Cuts.....dis 50 %
Atkins' Champion and Electric Tooth X Cuts.....dis 50 %
Atkins' Hollow Back X Cuts.....dis 50 %
Atkins' Shingle, Mulay, Drag, &c.....dis 50 %
W. M. & C. Hand.....dis 50 %
W. M. & C. Champion X Cuts Regular.....dis 50 %
W. M. & C. X Cuts Thin Back.....dis 50 %
Peace Circular and Mill.....dis 50 %
Peace Hand Panel and Rip.....dis 50 %
Peace Cross Cut, Standard.....dis 50 %
Peace Cross Cut, Thin Back.....dis 50 %
Richardson's Grenier and Mill.....dis 50 %
Richardson's X-Cuts, No. 1, 30; No. 2, 27; No. 3, 24
Hack Saws.....dis 50 %
Griffin's Hack Saws, complete.....dis 40x10 @ 50 %
Griffin's Hack Saw, Blades only.....dis 40x10 @ 50 %
Star Hack Saws and Blades.....dis 25 %
Diamond Hack Saws and Blades.....dis 25 %
Bureau and Crescent.....dis 25 %
Saw Frames.....dis 50 %
White Vermorel.....dis 50 %
Red, Polished, and Varnished.....dis 50 %
Saw Sets.....dis 50 %
Stillman's Genuine.....dis 50 %
Stillman's Imita.....dis 50 %
Common Lever.....dis 50 %
Morrill's No. 1, \$15.00; No. 2 & 4, \$24.....dis 50 %
Leach's.....dis 50 %
Hammer, Hotchkiss.....dis 50 %
Hammer, Bemis & Call Co's new Patent.....dis 50 %
Bemis & Call Co's Lever and Spring Hammer, dis 50 %
Bemis & Call Co's Plate.....dis 10 %
Bemis & Call Co's Cross Cut.....dis 10 %
Alken's Genuine.....dis 50 %
Alken's Iron.....dis 50 %
Hart's Patent Lever.....dis 30 %
Diston's Star, 20, No. 15, \$5.50, dis 10x10 @ 10x10x10 %
Atkins' Lever.....dis 10x10 @ 10x10x10 %
Atkins' Criterion.....dis 10x10 @ 10x10x10 %
Croissant Keller, No. 1, \$15.00; No. 2, \$24.00.....dis 10x10 @ 10x10x10 %
Avery's Saw Set and Punch.....dis 30x5 %
Saw Feet.....dis 10x10 @ 10x10x10 %
Atkins' Perfection.....dis 15.00; Excelsior \$6.00; dis 10x10 %
Beates.....dis 10x10 %
Hatch, Counter, No. 171, good quality.....dis 50 %
Hatch, Tea, No. 181.....dis 50 %
Union Platform, Plain.....dis 20 @ 20x5 %
Union Platform, Striped.....dis 20 @ 20x5 %
Chattillon's Grocers' Trip Scales.....dis 20 @ 20x5 %
Chattillon's Eureka.....dis 20 @ 20x5 %
Chattillon's Favorite.....dis 40 %
Family Turnbills.....dis 40 %
Richie Bros' Platform.....dis 5 %
Scale Beams, List of Jan. 12, 82, dis 50x10 @ 50x10x5 %
Chattillon's No. 1.....dis 50 %
Chattillon's No. 2.....dis 50 %
Scrapers.....dis 10x10 @ 10x10x10 %
Adjustable Box Scraper (R. R. & L. Co.), \$5.50, dis 10x10 %
Box, 1 Handle.....dis 10 @ 10x5 %
Box, 2 Handle.....dis 10 @ 10x5 %
Defiance Box and Ship.....dis 10 @ 10x5 %
Foot.....dis 10 @ 10x5 %
Ship, Common.....dis 10 @ 10x5 %
Ship, Providence Tool Co.....dis 10 %
Screen Window and Door Frames.....dis 35 @ 40 %
Porter's Pat. Window and Door Frame.....dis 35 @ 40 %
Screen Corner Irons, Warner's.....dis 35 @ 40 %
Stearns' Frames and Corners.....dis 25 @ 25x10 %
Screw Drivers.....dis 10x10 @ 10x10x10 %
Douglas Mfg. Co.....dis 10x10 @ 10x10x10 %
Diston's.....dis 10x10 @ 10x10x10 %
Diston's Patent Excelsior.....dis 10x10 @ 10x10x10 %
Buck Bros.....dis 10x10 @ 10x10x10 %
Stanley R. & L. Co's Varnished Handles.....dis 10x10 @ 10x10x10 %
Stanley R. & L. Co's Black Handles.....dis 10x10 @ 10x10x10 %
Sargent & Co's No. 1 Forged Handle.....dis 10x10 @ 10x10x10 %
Sargent & Co's No. 2, 10 and 60.....dis 10x10 @ 10x10x10 %
Knapp & Cowles' No. 1.....dis 10x10 @ 10x10x10 %
Knapp & Cowles' No. 1 Extra.....dis 10x10 @ 10x10x10 %
Knapp & Cowles' No. 00 & 1.....dis 10x10 @ 10x10x10 %
Stearns'.....dis 10x10 @ 10x10x10 %
Gay & Parsons.....dis 10x10 @ 10x10x10 %
Champion.....dis 10x10 @ 10x10x10 %
Crawford's Adjustable.....dis 10x10 @ 10x10x10 %
Elrich's Socket and Ratchet.....dis 25 @ 25x10 %
Allard's Spiral, new list.....dis 25 %
Kolb's Common Nuts.....dis 25 @ 25x10 %
Syracuse Screw-Driven Bits.....dis 30 @ 30x5 %
Screw Driver Bits, Parry.....dis 30 @ 30x5 %
Fray's Hol. Hds. Steel, No. 3, \$15.....dis 25 @ 25x10 %
P. D. & Co's, All Steel.....dis 25 @ 25x10 %
Screws.....dis 10x10 @ 10x10x10 %
Wood Screws-List, Brass, Jan. 27; Iron, July 1, 1887
Flat Head Iron.....dis 70 %
Round Head Iron.....dis 65 %
Flat Head Brass.....dis 60 %
Round Head Brass.....dis 60 %
Flat Head Bronze.....dis 65 %
Round Head Bronze.....dis 60 %

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DECEMBER 5, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

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THE IRON AGE

THURSDAY, DECEMBER 20, 1888.

Stifel's Sash-Pulley Grinder.

There is nothing in the homely aspect and size of the axle pulley, or sash pulley, to suggest the important part it has played

its service in lightening the work of hoisting windows, but it has a thousand other uses, and millions of these little castings enter into the construction work of the American people every year. As it pos-

it is thought will accomplish very remarkable results of this character. It is the invention of Mr. Herman C. Stifel, of the N. O. Nelson Mfg. Company, at St. Louis, Mo., and is expected to exert an important

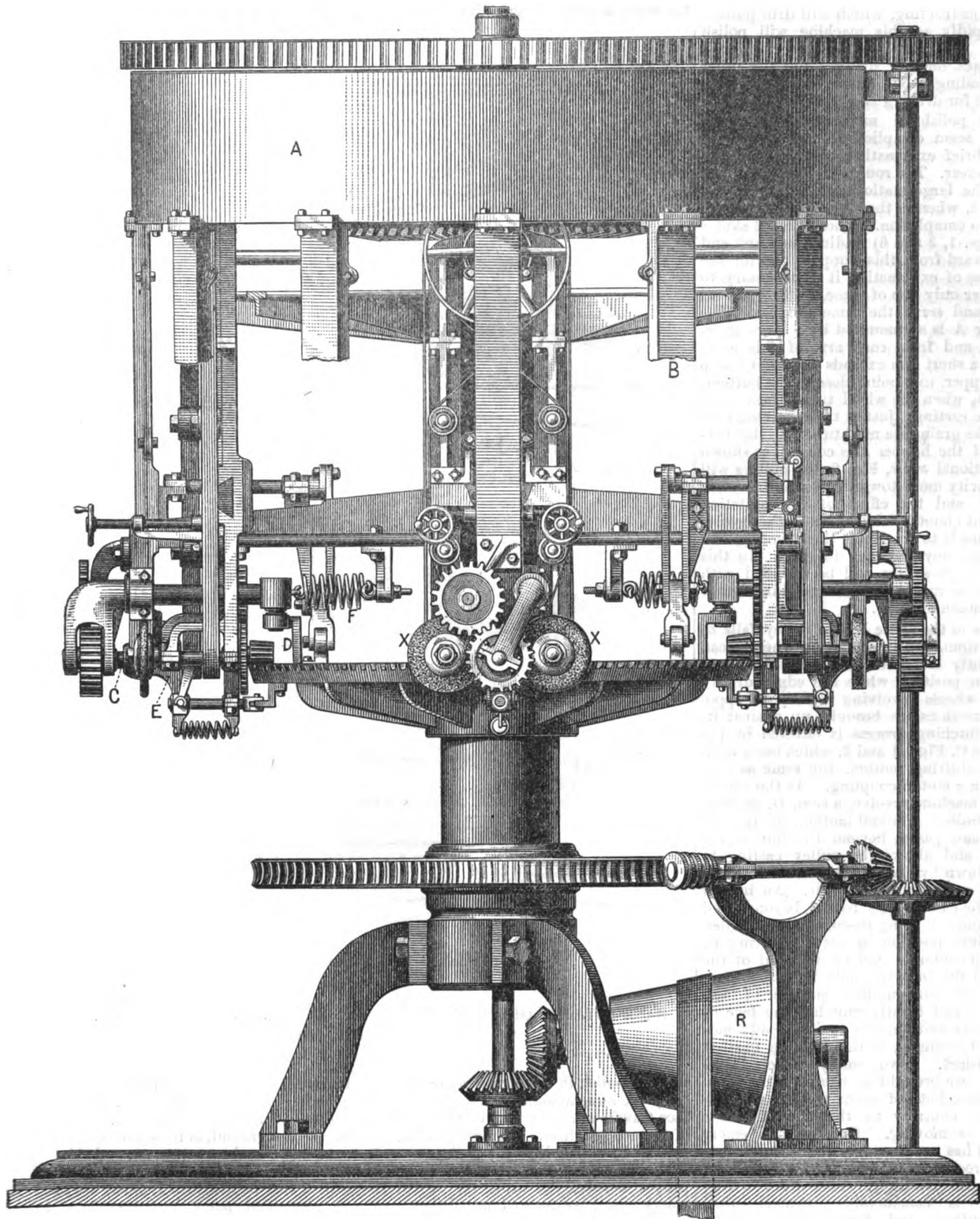


Fig. 1.

GENERAL ELEVATION OF THE STIFEL SASH-PULLEY GRINDING MACHINE, BUILT BY THE N. O. NELSON MFG. COMPANY, ST. LOUIS, MO.

as a luxury in the lives of the people and as a science. Like many another agent in modern civilization, it has a merit out of all proportion to its appearance. It has become most familiar to the masses through

sesses a virtue, therefore, anything which tends to cheapen its cost, so as to widen the field of consumption, has interest for everybody. We present accordingly in this issue engravings of a machine which

influence on this branch of manufacture. Axle pulleys are first cast rough. Their cost up to that point is merely nominal. The work of drilling a hole for the axle, which will be in the exact center, and of

polishing the groove and edges so that it will carry smoothly a small rope or cable involves the main cost of the product. At the present time these pulleys are drilled and polished respectively by machines which have a capacity for turning them out at the rate of from 3000 to 4000 per day. Mr. Stifel's machine, it is claimed, will readily polish 50,000 in the same time, or as many as 12 machines such as are now in use can prepare for it. It may be stated here that the inventor expects in a short time to present to the public a machine complementary to the one he is now constructing, which will drill pulleys as rapidly as this machine will polish them. In short, he will do with two machines, one for drilling and the other for grinding, what is now being done with 24—12 for drilling and 12 for polishing.

The polishing machine in question might seem complicated at first glance, but a brief explanation will make everything clear. The rough pulleys are thrown into the large stationary hopper A, Figs. 1 and 2, whence they progress automatically to completion. There are 12 shutes B (Figs. 1, 2 and 6) leading outward and downward from this hopper; but for the purpose of explanation it is necessary to consider only one of these, as they are all alike and serve the same purpose. The hopper A is surmounted by a large gear-wheel, and from each arm of this gear-wheel a short arm extends downward into the hopper, to a point close to the bottom, so that, when the wheel turns, these arms stir the castings, just as the revolving rake stirs the grain in a mashtub. As the bottom of the hopper A is conical, as shown in sectional view, Fig. 2, the pulleys will by gravity move toward the mouths of the shutes, and the effect of the agitation brought about by the action of the revolving arms is to accelerate their motion and overcome any tendency to stick. In this manner, the shutes will be supplied with pulleys as rapidly as the machine below can dispose of them.

Once in the shute B, the pulley falls to the bottom, and into position where it can be tightly clutched, slowly revolved and held in position while the edges of two emery-wheels revolving rapidly in opposite directions are brought up against it. This clutching process is effected by the spindle C, Figs. 1 and 2, which has a horizontal shifting motion, the same as that used in a clutch coupling. As the wheels of the machine revolve, a cam, D, gives to the spindle C a lateral motion, so that its inner end passes beyond the line of the shute, and allows the pulley casting to drop down by its own weight on to the gate E arranged to receive it. An instant later the cam D has passed beyond, and the spindle C being disengaged, is pulled back into position by a strong spring F. A small center or pin on the end of the spindle fits into the hole in the pulley, while the surrounding surface of the spindle end tightly clutches the face of the pulley and imparts to it a steady motion. It remains in this position until it is polished. Two emery wheels, X X, Fig. 1, are brought up against it on opposite sides, both of them revolving in directions contrary to that in which the pulley is moving. One of the emery wheels has a convex edge, which fits into the groove of the pulley, and polishes it almost instantly. The other emery wheel is considerably thicker than the pulley, and has a square edge, which is brought up against the two sharp rims that border the groove and constitute the largest circumference of the pulley, thus grinding these rims smooth at the same time that the groove is being polished. In order that the sharp rim may not cut creases into this thick emery wheel, the latter receives from a cam a very slow and slight lateral motion back and forth,

thus equalizing the wear. The emery wheels are located at the foot of the vertical arms, as shown in Figs. 1 and 5. These arms are brought together by a heavy spiral spring (S, Fig. 5), and are thrown apart by a cam (H) for a sufficient length of time to admit of dropping the finished pulley and substituting a rough one. As the emery wheels must decrease in diameter through wear, a hand wheel (I, Figs. 1, 2 and 5) is provided by which the attendant at intervals can move the arms inward. The machine is so constructed that each pulley is subjected to exactly the same amount of grinding—that is to

column of pulleys in the shute while the release of the finished one is being effected. When the gate at the bottom of the shute closes again, the ram is withdrawn and the column of pulleys moves down, the lowest being centered, clutched and polished as above described. This operation goes on, over and over again, at the bottom of each of the shutes (B).

Steam Jet Phenomena.

Herr R. Von Helmholtz has sent to *Wiedemann's Annalen* some observations made by himself upon a jet of steam. He

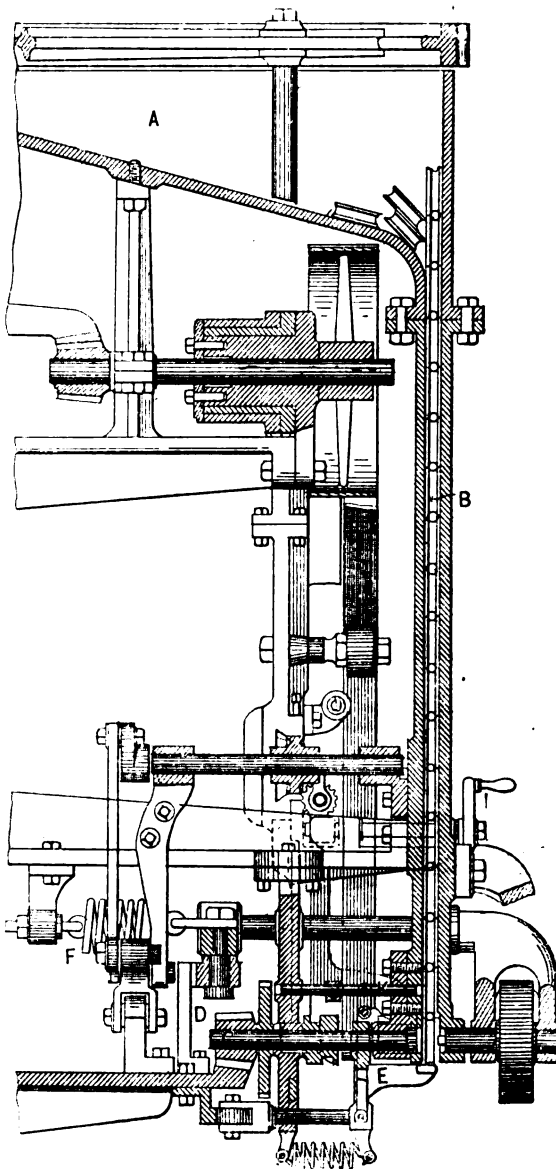


Fig. 2.—Partial Vertical Section.

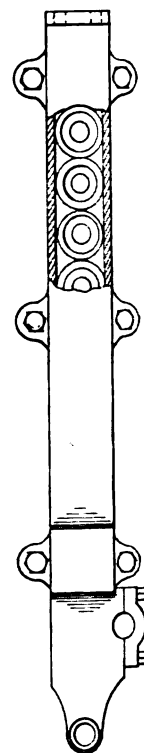


Fig. 3.—Detail of a Pulley Shute.

SASH-PULLEY GRINDER, BUILT BY THE N. O. NELSON MFG. CO., ST. LOUIS, MO.

say, the polish in each case represents exactly the same amount of emery wheel surface travel, whatever may be the diameter of the emery wheel. This result is accomplished by use of different pulleys as at R. When a pulley has been polished to a proper degree, the arms on which the emery wheel are located are driven apart by the cam (H), as already explained. The spindle which clutches the pulley is thrown outward by its cam, a gate opens, and the pulley is released and allowed to drop into a receptacle set under the shute. At the instant of its release, a ram (K, Fig. 2), situated just above the clutch spindle, is driven forward, and its end enters the center or axle hole of the pulley next in order, thus holding up the entire

remarks that a jet of steam escaping from a hole of 1 or 2 mm. diameter, lighted obliquely and observed upon a black background, is invisible at the lower extremity, and presents toward the top the well-known whitish appearance. This aspect may be modified in many ways. If an electrified point is brought near the steam, the jet immediately becomes azure blue, or, according to the power of the electrical machine, purple, red, yellow, green, &c. These tints are intimately connected with the dimensions of the liquid drops, and hence it follows that the electrical point has the power of provoking condensation of the supersaturated vapor which is found at the lower part of the jet. The same result is obtained by bring-

ing near to the steam jet a platinum wire made brightly incandescent by an electrical current, or silver, iron, copper or brass wires simply made red hot in a flame, or jet steam by the aid of a chimney or by simple blowing, produce a very energetic effect. Finally, traces of certain chemical substances introduced into the steam jet

supersaturated vapors, but their presence cannot be invoked here to explain the preceding facts.

The author is of opinion that they may be attributed to a molecular concussion, the effect of which may be compared to that of mechanical concussion upon superheated or supersaturated liquids. A flame, for example, is the scene of closely approximated and extremely varied movements, and the chemical atoms which are incessantly passing in it from one combination to another are found in every kind of unstable condition. These movements and changeful states of equilibrium leave their traces in the products of combustion at a certain distance from the flame properly so called, and determine the observed phenomena. The luminous effect produced at the extremity of an electrified point and the presence of ozone in its vicinity show that this point is the cause of concussions comparable to those provoked by active combustion, and the analogy between the two phenomena is found again in the fact that they both furnish means for making electricity pass through gas. As to solid incandescent bodies, they can act either through the emission of solid particles from their surfaces or by the chemical concussions which they communicate to the surrounding gases.

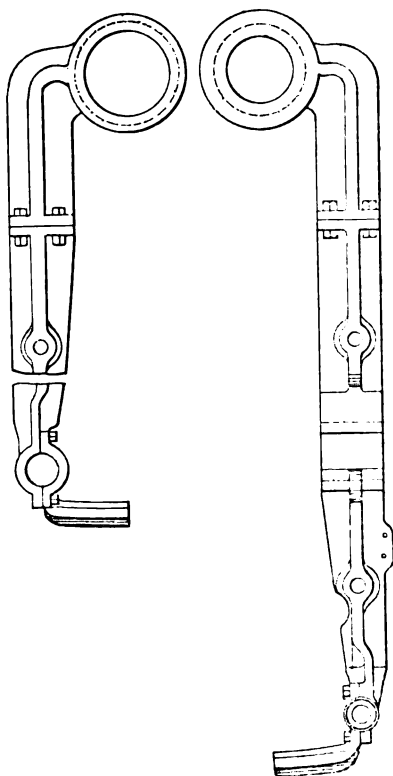


Fig. 4.—Enlarged View of Arms Carrying Emery Wheels.

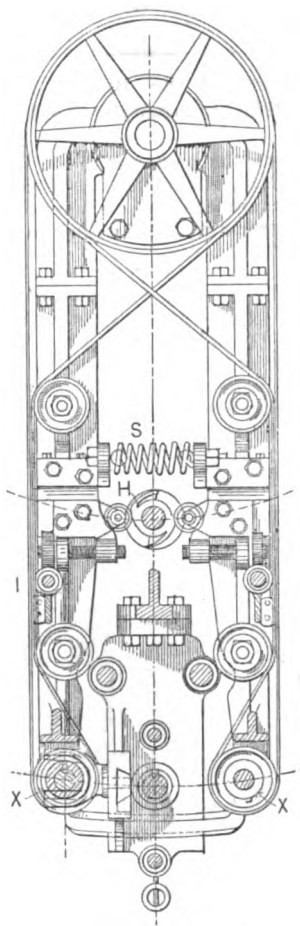


Fig. 5.—Detail of Emery Wheel Mechanism.

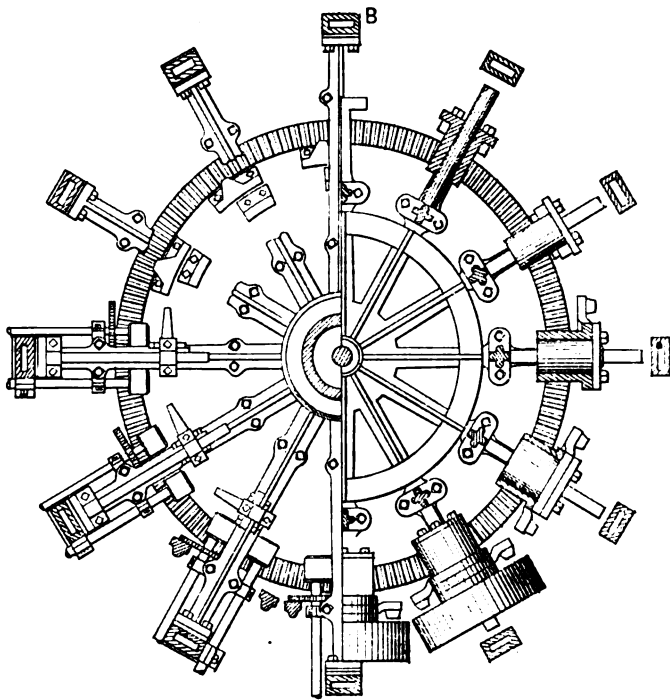


Fig. 6.—General Plan.

SASH-PULLEY GRINDER, BUILT BY THE N. O. NELSON MFG. CO.,
ST. LOUIS, MO.

even glass heated below the red, or an organic matter, wood, paper, &c., in a state of slow combustion. The products of any flame whatever, with the exception of the flame of pure alcohol, directed upon the

cause the same modification. Among these are hydrochloric and nitric acid, but concentrated sulphuric acid especially shows the phenomenon. It is known that solid dust particles provoke the condensation of

The test suit brought by John W. S. Earnshaw against Collector Cadwalader, of Philadelphia, to recover alleged excess of duties on imported iron ore, is to be carried to the United States Supreme Court on appeal from a verdict rendered against the plaintiff, and on Tuesday the motion for a new trial was withdrawn. The suit involves the question of allowance for moisture in assessing the duty on imported iron ore.

A scheme is on foot to connect Perth Amboy and Staten Island with a bridge, to be built across the Staten Island Sound, and steps have been taken to put it in more definite shape by applying to the next Legislature for the passage of a bill the general object of which is to authorize the erection of a bridge across the Kill von Kull, to project from a point in Middlesex County at or very near Perth Amboy, to a point opposite in Staten Island, in Westfield, Richmond County. The capital to be expended will be \$1,000,000.

The Kunstädter Steering Screw.

We were given an opportunity last week of examining the Kunstädter screw steering and propelling apparatus, which is at present being completed at the Vulcan Iron Works, at Jersey City, for the new Boston fire-boat, together with the engines and boilers, which latter, we may remark here incidentally, are of a novel type of water-tube design. Having illustrated and described the Kunstädter screw, as applied to the Navy-Yard tug Nina, in our issue of August 6, 1885, it is scarcely necessary for us to go into the matter in detail here. We will simply repeat briefly that Mr. Kunstädter arranges two screws in line with each other, one behind the other, the steering screw, so-called, being on a separate piece of shafting, which is connected to the main shaft by a universal joint, enabling the steering screw, which is mounted aft, to be turned either to starboard or to port up to an angle of 45°, and thus adding its influence to that of the rudder in turning the vessel. The rudder itself may accordingly be made much smaller than is ordinarily the case without in the least detracting from the superior maneuvering capacity of the ship. The universal joint has several features of excellence and some advantages which are not found in the device as ordinarily constructed, special precautions being adopted to prevent working loose of the pins.

In the case of the Boston boat the screws are of the same diameter, but different pitch, and the rudder extends behind the steering screw. In this respect the arrangement differs somewhat from that adopted in the tug Nina, where the steering screw was of considerably smaller diameter than the main propeller, and its separate shaft extended through a sleeve in the rudder, the supplementary screw thus being at the extreme end. It is a noteworthy circumstance that in the case of the Boston boat the propellers, as well as stern frame, are steel castings, having been turned out at Cleveland, and are claimed to be the first of the kind in the country. Facilities had been provided at the Vulcan Works for slowly revolving the screws, thus giving a good opportunity for examination of the working of the apparatus. The fire-boat to which it is to be applied will measure 125 feet along the keel, and the engine will develop 750 horse-power.

Mr. Kunstädter informs us also that the new Hoboken ferry-boat Bergen, which, as is known, is fitted up with triple-expansion engines and a propeller at each end, mounted upon one continuous shaft in place of the customary paddle-wheels, will be fitted up with his screw after a few preliminary trips. Besides adding to the maneuvering capacity of the vessel, the appliance materially augments the speed.

Extraction of Oil from Wood.—Referring to the extraction of oil from wood in Sweden, to which we directed attention some time ago, *La Nature*, in a recent issue, says that it is becoming year by year a more important industry. Those parts of the trees which have hitherto been regarded as useless, such as the stumps and roots, are no longer left in the forest to rot, but are subjected to various methods of treatment, by which not only wood oil, but also turpentine, creosote, acetic acid, charcoal and tar are obtained from them. The oil, as it is now usually extracted, cannot be burnt in ordinary lamps, for it smokes too much. But it may be used in special lamps, which are not dissimilar to the usual photogen lamps. The latter can easily be adapted to wood oil, and when the oil is mixed with a certain quantity of photogen it may be consumed in ordinary lamps. It costs about 3d. per pint; it does not explode, and lasts 25 times longer

than photogen. When intended for lighting it is extracted wholly from pines and firs. Thirty factories in Sweden are said to make its extraction part of their business, and the production is referred to as considerable.

Core Ovens at the Brown & Sharpe Mfg. Company's Works.

Through the courtesy of the Brown & Sharpe Mfg. Company, of Providence, R. I., we are enabled to present on this page engravings representing a general

properly utilized. Cores can be baked well in any part of the oven, and are free from the ashes, smoke and gases of the fire.

The flues and stove are better shown in Fig. 2, and the direction of the draft is indicated by the arrows. The arrangement may be modified according to the position and size of the ovens in which it is used, and it is suitable either for small ovens where only small cores are baked, or for larger ovens where a carriage is used with adjustable shelves, on which cores of any size are placed. The ovens can also be made with the stove at the left of the

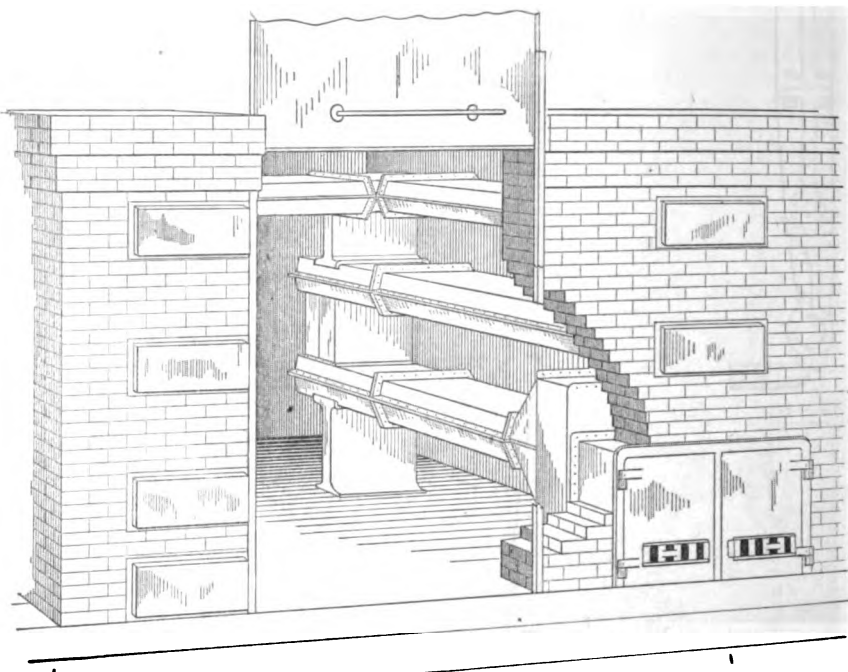


Fig. 1.—General View Showing Portion of Interior.

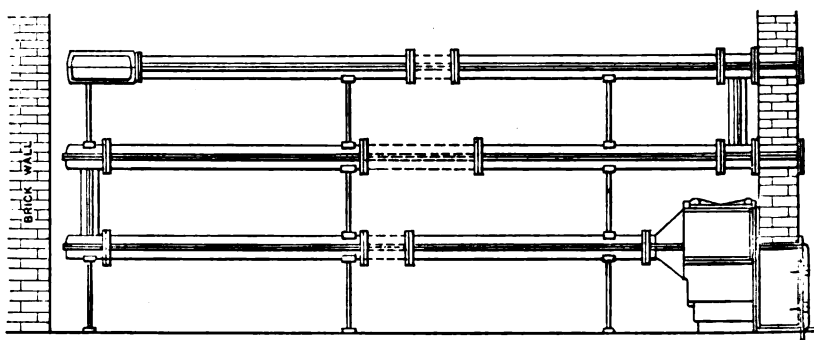


Fig. 2.—Longitudinal Section.

CORE OVEN, BUILT BY THE BROWN & SHARPE MFG. COMPANY, PROVIDENCE, R. I.

view and a section of the core ovens designed by them and made for their own use.

The general arrangement of the ovens is at once apparent from Fig. 1. In several respects it is decidedly superior to the common oven with a fire-pit in one corner. The distinctive feature is a rectangular cast-iron stove or flue or smoke-box, which is connected with the fire-box, and runs inside the oven, back and forth, in several tiers along the sides and across the end, thoroughly distributing the heat, and forming a series of shelves upon which core plates can be placed. There is a damper near the outer end, and the flue is connected with a chimney where there is a good draft. The stove is similar to the fire-box of an ordinary horizontal boiler; a light fire can be carried, and the fuel

door, or arranged for using two stoves, either one or both being employed as desired. The dotted lines in Fig. 2 represent the parts that may be shortened or lengthened as required by the length of the oven. A number of the leading locomotive and machine-tool builders are using the Brown & Sharpe oven, and pronounce it satisfactory.

Judge Cooley says he does not think that any part of the Interstate law will be repealed. On the contrary, some of its provisions may be made more stringent. He called the attention of railroad men at Chicago to the fact that rate cutting, the payment of commissions, &c., were all violations of the Interstate law, that could, upon conviction, be punished by the infliction of a fine of \$5000 for each offense.

A New Automatic Engine.

We present on this page an engraving of a new automatic engine brought out by John Ramming, 304-306 S. Main street, St. Louis, Mo.

The bed is a combination of the box and girder type, possessing strength and rigidity, together with compactness. The pillow block is fitted up with a heavy phosphor-bronze shell, and gun-metal quarter boxes partly filled with babbitt metal, and has convenient adjusting facilities. The length of the connecting rod is calculated on a basis of three times the length of the stroke of the engine, and is fitted up with stub ends and gibs, and keys of such proportion as to admit the use of wrist-pins of a diameter of more than one-fourth the diameter of the cylinder. The crosshead has its wrist-pin in center of bearings. The cylinder has short steam passages and a large exhaust port, and is bolted direct to the end of the

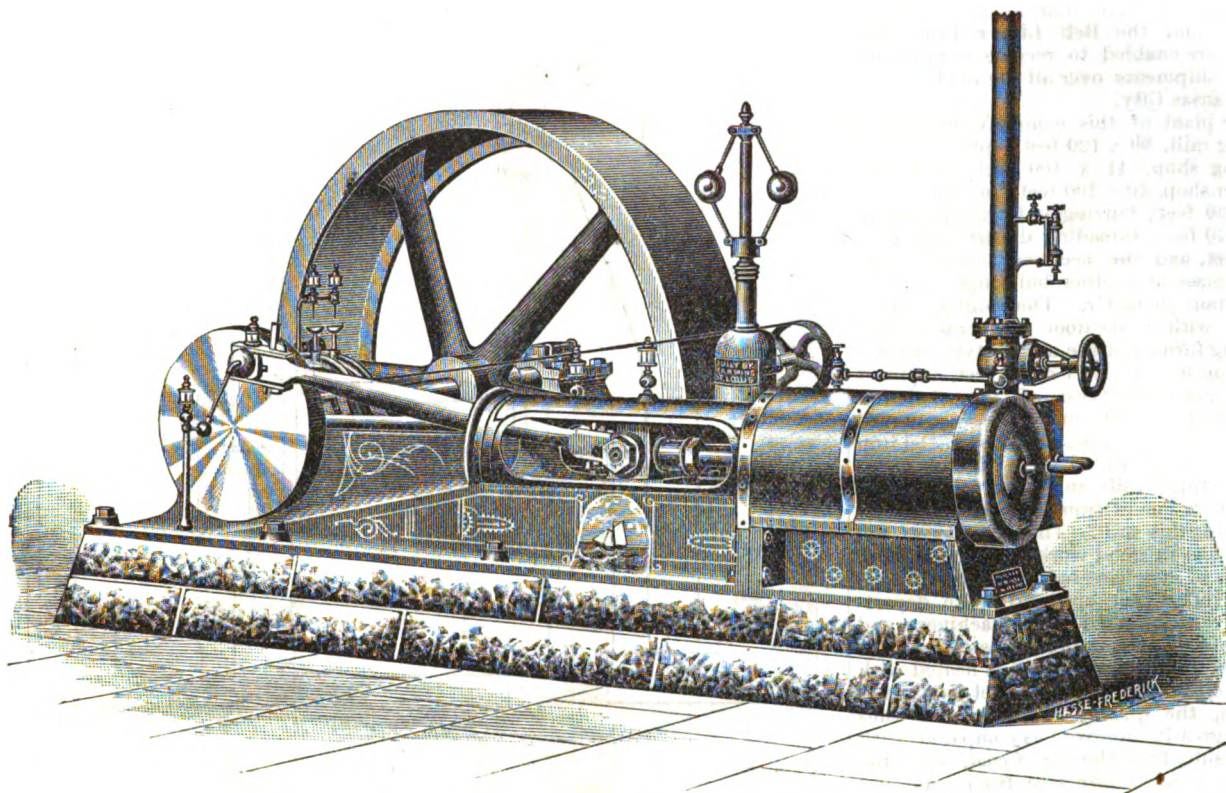
The cylinder is covered with a heavy sheet-brass jacket, and the cylinder head and steam chest have polished nickel-plated covers. The engine is claimed to be economical, and is made in sizes from 30 to 300 horse-power.

The Federation of Labor.

The third annual National Convention of the American Federation of Labor was held in St. Louis, the president being Samuel Gompers, who was formerly a leader among the cigarmakers. This new organization of trade unions, which conducts its operations quietly, but without secrecy, has, within two years, risen to proportions of vast magnitude in the United States. It is now numerically the strongest labor organization in the world. According to a report recently issued from headquarters there are over 3000 local unions in affiliation with it, and its total

Coal Miners' Protective Association, Horse Collar Makers' National Union, Tailors' National Progressive Union, Furniture Workers' National Union, American Flint-Glass Workers' Union, Granite Stonecutters' National Union, Iron Molders' National Union, Amalgamated Association of Iron and Steel Workers, Journeymen Barbers' National Union, Metal Workers' National Union, Brotherhood of Painters and Decorators, Shoe Lasters' National Union, Custom Tailors' National Union, Textile Workers' Progressive Union of North America, International Typographical Union, Umbrella, Pipe and Cane Workers' Union of America, and the Wood Carvers' National Union.

Some of the titles in the foregoing list represent a very large membership. The Brotherhood of Carpenters has 53,000 enrolled members in 445 cities; the Iron Molders' Union has 28,000 members; the Cigarmakers' Union has 28,000; the Amalgamated Association of Iron and Steel



NEW AUTOMATIC ENGINE, BUILT BY JOHN RAMMING, ST. LOUIS, MO.

engine bed. A false head, which acts as a packing chamber for the piston-rod on the outside and for a cylinder centering-piece inside, is forced into a bored opening in the end of the bed. The cylinder is finished on the bottom, and rests on a planed extension-piece which supports the full length of the cylinder. Automatic segmental cast-iron piston packing of improved design is used in the cylinder. There are two main valves and two cut-off valves of simple balanced design worked by two eccentrics with wide wearing surfaces. The governor is especially designed to meet the requirements of this style of valve, and is very sensitive to changes of speed. It can be adjusted to any required speed while the engine is running. This engine, owing to the construction of the valves, is claimed to give full opening for the admission of steam at a valve travel of $\frac{1}{4}$ inch. The engines can be run at high speed.

Special attention is called to the fact that there is not a single spring used of any kind in connection with the governor or valves. All wrist-pins, piston and valve-rods are of steel. The connecting-rod and engine-shaft are hammered iron.

membership runs as high, in round numbers, as 635,000. It is organized on the principle of the independence of the trade and labor unions belonging to it. Each of them retains the right of managing its own affairs without interference, and the Federation merely deals with those general questions in which all of them are interested, and upon which united action is considered desirable. Its assessments are very light; it has but few officers. Their powers are very restricted, and it has not yet suffered from secessions, bickerings, or the ambition of its leaders. The dues of its members are but $\frac{1}{4}$ cent per month, or 3 cents per year, and the wages of its president are but \$100 per month. Upon its roster of unions are to be found such diverse trades as these:

Bakers' National Union, International Boiler Makers' Union, Cabinet Makers' National Union, Beer Brewers' National Union, International Boatmen's Union, National Union of Coopers, German-American Typographia, Brotherhood of Carpenters and Joiners, Cigarmakers' International Union, National Federation of Miners and Mine Laborers, Miners and Mine Laborers' Amalgamated Association,

Workers has over 35,000; the Journey men Bakers' National Union, 19,000; the Federation of Miners, 25,000; the International Typographical Union, 35,000, and so on to the end of the chapter. Many of these organizations have well filled treasuries, and expend large sums annually in the maintenance of their various benefit features. The American Federation is an outgrowth from several old bodies, which were vigorous in their time, but which had objectionable features that have been carefully removed from the present organization. It was as far back as 1866 that the National Labor Union Congress, formed here in imitation of the British Trade Union Congress, was held, but it was split to pieces on the rock of party politics. It was not until 1886 that the American Federation in its present form, which is non-political, was successfully established, and it is since that time it has expanded into the proportions here spoken of.

During a recent trial trip on Delaware Bay the dynamite cruiser Vesuvius, under forced draft, developed a speed of 21.47 knots per hour. The contract calls for a speed of only 20 knots.

The Kansas City Bolt and Nut Works.

The works of the Kansas City Bolt and Nut Company, of Kansas City, Mo., are now running and ready for orders of any kind in their line, having just been completed. This company was incorporated April 6, 1888, and the construction of their plant has been pushed with remarkable vigor to get it into operation so soon. The directors of the company are J. H. Sternbergh and Philip Sternbergh, of Reading, Pa., and J. C. Howes, Hillery Missemmer and Horace A. Keefer, of Kansas City, Mo. J. H. Sternbergh is president, J. C. Howes is vice-president and treasurer, and Hillery Missemmer is general manager and secretary. The capital stock of the company is \$200,000. The works are located four miles east of the business center of Kansas City on the lines of the Missouri and Pacific Railway, the Kansas City and Southern Railway and the Kansas City, Independence and Park Railway. Through the connections of the Missouri Pacific and the Belt Line railways the works are enabled to receive freight and make shipments over all the roads entering Kansas City.

The plant of this company embraces a rolling mill, 90 x 120 feet; spike and nut forging shop, 41 x 100 feet; bolt and washer shop, 40 x 100 feet; machine shop, 40 x 30 feet; burring and tumbling shop, 40 x 70 feet; threading department, 41 x 100 feet, and the necessary engine-house, warehouse and other buildings of a less important character. The rolling mill is fitted with a six-door regenerative gas-heating furnace of the newest type, with a working hearth 7 feet by 18 feet, supplied with gas from two of the Swindell Construction Company's latest improved gas producers. For the present the iron made will be rolled on a 10-inch train. The castings, rolls and other parts of this train were made from new patterns especially for this mill. The capacity of the mill when in good working order will be 20 tons of merchant bar, nut and bolt iron daily. The bolt, nut and spike departments are supplied with machinery and tools of the most improved patterns. The iron in these departments is heated with crude oil on the Aerated Fuel Company's system, the quality of the work thus being greatly improved as compared with the results from the use of coal, while the iron is also entirely free from scale and other defects.

The company will manufacture a great variety of bolts and nuts, washers, rivets, railway spikes, and also splice bars and merchant bar iron. They will make a specialty of the Harvey patent grip track bolt, the patents for which they own. They occupy a very excellent location at Kansas City to secure an important share of the trade of the West in the lines in which they have embarked, and, as the company's officers are men of long experience in this particular branch of manufacture, a bright future seems to be assured. Their success will have great influence in determining the future movements of other manufacturers who are now canvassing the advantages of various Western points with a view to the erection of works nearer their customers.

The Baldwin Locomotive Works, of Philadelphia, are approaching the close of a year of extraordinary prosperity and activity. From January last to the present time they have delivered 654 new locomotives. This is the largest production in any year since the works have been in existence. In 1887 for the entire year the works delivered 653 locomotives; this year, by the time it closes, they will have delivered over 700. The contracts have

included 50 locomotives for the Pennsylvania Railroad Company and 60 for the Philadelphia and Reading Railroad Company. Five locomotives have been shipped to the Dom Pedro Segundo Railway Company, in Brazil, and 30 to the Provincial Railway Company, of Buenos Ayres. Mr. John H. Converse, of the firm of Burnham, Parry, Williams & Co., says that the

Compound Ide Engine.

The Foundry and Machine Department of the Harrisburg Car Mfg. Company, at Harrisburg, Pa., are building for Messrs. John Post, Jr., & Co., of Boston, an Ide compound engine. It is intended, we understand, for the Plymouth Electric Light Company, of Plymouth, Mass. The nature

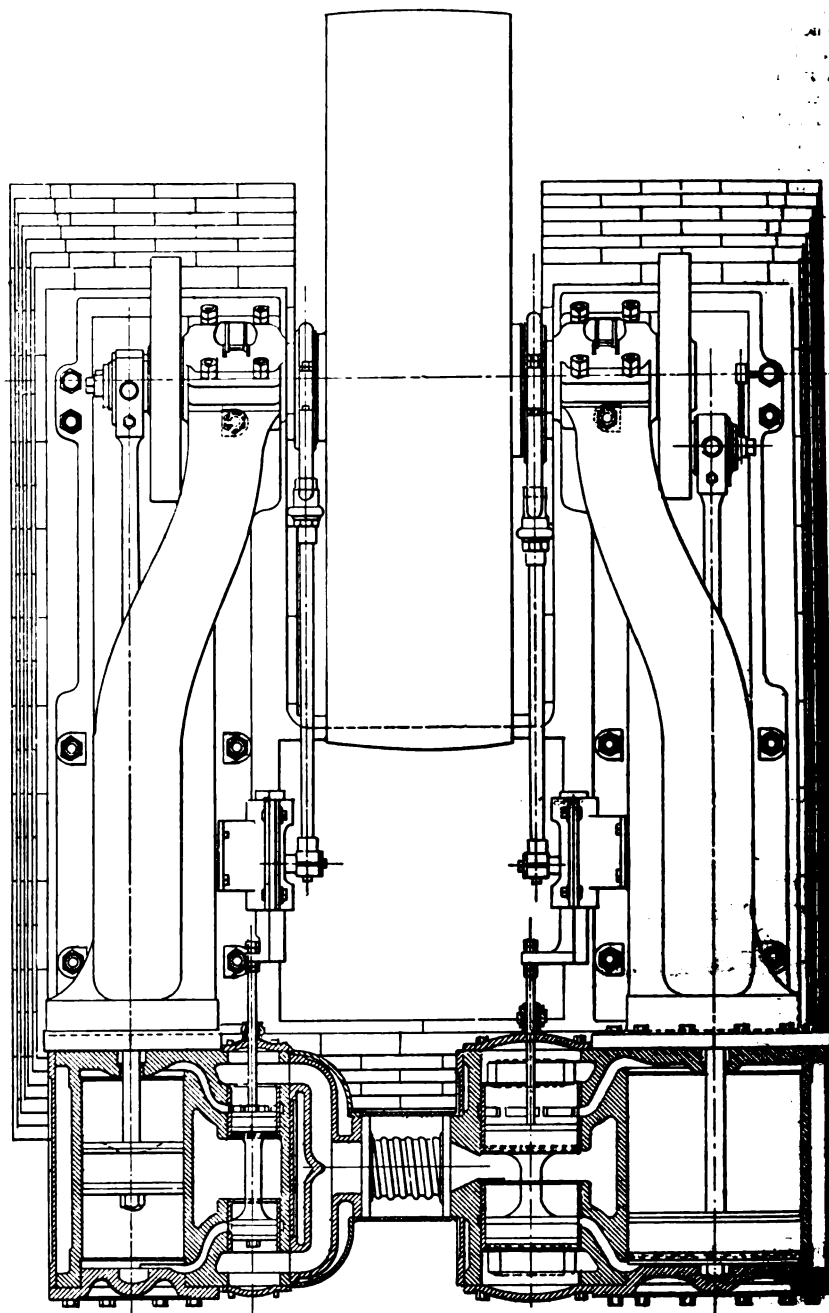


Fig. 1.—Sectional Plan.

COMPOUND IDE ENGINE, BUILT BY THE FOUNDRY AND MACHINE DEPT OF THE HARRISBURG CAR MFG. CO., HARRISBURG, PA.

large demand for locomotives is mainly attributable to the prosperous activity of railway traffic throughout this country and South America.

The Asylum street bridge of the New York, New Haven and Hartford Railway was tested last week and showed a deflection of only $\frac{1}{4}$ inch of the main girders under a load of 355,980 pounds, returning to position when the load was taken off. The span is 77 feet. The bridge was built by the Berlin Bridge Company, of Berlin, Conn.

of the design will be understood from the elevation and plan which we give.

The simple Ide automatic engine as originally brought out, and subsequently improved, we have illustrated and described in previous issues, and need, therefore, not enter into all the details of construction of the present form. The high-pressure cylinder is provided with the Ide automatic cut-off governor, and steam will be cut off in it at one-third stroke. The low-pressure cylinder will cut off positively at one-third stroke, the proportions being such that each engine will do an equal amount of work. The low-pressure cut-

off, however, is adjustable. The cranks are placed at an angle of 90°, which insures more uniform motion. The connection between the two cylinders is made flexible, so that expansion will not disturb their alignment. The connection between the two engines is also very direct, and makes a receiver of sufficient capacity to admit of an initial pressure in the second cylinder about equal to the final pressure in the first. The exhaust in neither case passes through the valve, but is provided at each end of the valve for exhaust. Steam is taken in the center, so that the heat of the live steam is not so readily conducted to the atmosphere by the exhaust, or, in case of condensing, to the condenser. The connection between the two cylinders is protected by non-conducting material, and covered with a jacket. The latter is allowed to be free at one end, so that there

1887, and brought the total freight tonnage for the season to December 1 up to 6,409,278 tons. This, a Cleveland paper remarks, is doubtless the greatest volume of business which has ever passed through any ship canal in an equal period. It is about the usual tonnage of the Suez Canal for an entire year, showing a monthly traffic twice as great as that of the famous highway opened through the Egyptian sands by Count de Lesseps. The growth of the commerce of the great lakes is wonderful, even in this land of industrial marvels.

The Cameron Iron and Coal Company.

In our issue of last week we made mention of the fact that the new blast furnace of the Cameron Iron and Coal Company, at Emporium, Pa., had been put in blast.

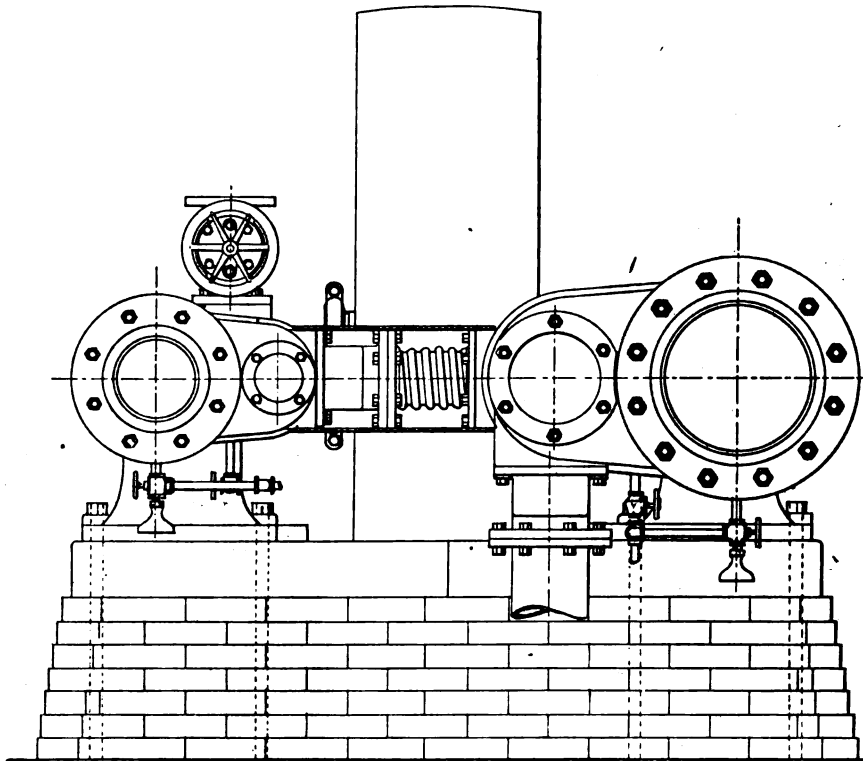


Fig. 2.—End Elevation.

COMPOUND IDE ENGINE, BUILT BY THE FOUNDRY AND MACHINE DEPT.
OF THE HARRISBURG CAR MFG. CO., HARRISBURG, PA.

will be no resistance to expansion and contraction.

The two engines are securely doweled and bolted to a base-plate, with a planed surface. This plate is allowed to project a trifle on both ends of the engine. It can be put upon the foundation, and, with the use of straight-edge, can be brought properly into line. The projections on the end enable examination at any time, to determine whether it has been drawn out of line. The engines may therefore be dismantled, shipped separately and erected without liability of getting them improperly set up. Both cylinders, as shown in Fig. 2, are provided with the Ide safety caps, in which the cylinder condensation water accumulates, and which will give way before any serious strain can come on the cylinder heads. When broken, they can be easily replaced. The cylinders measure 10 and 17 inches in diameter, and have a 14-inch stroke. The engine will run at a speed of 240 revolutions per minute.

The last month of any considerable traffic through the Sault Ste. Marie Canal showed a gain of 105,000 tons over November,

We have since received from Joseph Hunt, general manager of the firm, some additional advices regarding the new furnace. "The furnace just blown in was built by the Cameron Iron and Coal Company, at Emporium, to consume the coal on their property, and, incidentally, to also use such carbonate ores as they may mine, there being, from the developments made, indications of a large amount on the property and contiguous to it in this coal basin. We have located the furnace at Emporium, as it is at the junction of the Western New York and Pennsylvania Railroad and the Pittsburgh and Erie Railroad, thus securing easy access to the Eastern and Western markets, and also Buffalo and the New York State markets. The furnace was erected under my design and supervision, by Riter & Conley, of Pittsburgh. It is 16 feet at the bosh and 75 feet in height, and has three fire-brick stoves, each 18 x 70 feet, of Taws & Hartman's latest design. We have 1000 horse-power of the Heine safety boiler, built by J. P. Witherow, of Pittsburgh, and two blowing engines, with a new and excellent type of steam valves, allowing a large change in cutting off steam. Each engine has a 5-foot stroke,

42-inch diameter steam cylinder and 84-inch blast cylinder. The engines were built by the Scott Foundry Department of the Reading Iron Works, at Reading, Pa. Our hoist is worked by a 12 x 12 double-cylinder engine, built by the Crane Mfg. Company, of Chicago. The cast house is of brick, 150 x 50 feet, and stock house, now building, by Riter & Conley, of Pittsburgh, is of wrought iron, 75 x 192 feet. We expect to use our own coal, and are now erecting 100 coke ovens for that purpose. Our ores will be brought from the Lake Superior region, Wayne County, N. Y., and Centre County, Pa., and will be used in conjunction with our local carbonates in the manufacture of foundry irons. It is the intention of the company to increase the plant as the business justifies, and the anticipation is that finally four furnaces will be built, and I have laid out the plant with that in view. We have been in operation since the 30th ult., and trust to show creditably in the market ere long."

The Heroult Aluminium Process.—

The Heroult process for the production of aluminium, though electrical, differs from that of Messrs. Cowles Brothers in being, in the main, electrolytic. The furnace has a carbon pole at the top and the current passes through it and down through the melted aluminium oxide to an electrode of molten aluminium at the bottom of the furnace. As the above takes place the aluminium oxide is decomposed, the oxygen passing upward and combining with the carbon block, while the molecules of aluminium pass downward and are merged in the bath of molten metal. The furnace is a carbon block hollowed out to a suitable shape and surrounded by an iron frame. There is an opening in the bottom of the furnace for drawing off the reduced aluminium. The distance of the upper carbon electrode from the aluminium is regulated by an attendant and is kept as small as possible. The ore generally used is alumina and the process is a continuous one, but can hardly be considered as any very great advance on previous methods, as on an average 15 horse-power hours are required for the production of 1 pound of the metal. Works have been erected at Neuhausen, Switzerland, for carrying out the process on a commercial scale, the power required being furnished by a turbine of 300 horse-power.

Rust-Proof Wrapping Paper.—A new method for preparing paper for wrapping metallic articles to prevent tarnishing, says an exchange, consists in incorporating with the paper or applying to its surface a fine powder of metallic zinc in such a manner that it will adhere, so that when silver, copper, brass, or iron articles are wrapped in the paper they will be preserved from rusting or tarnishing by reason of the mere affinity of the zinc for sulphureted hydrogen, chlorine or acid gases or vapors, and preventing them from rusting or tarnishing the metallic articles wrapped in such paper. This is done by sifting on the sheet of paper pulp, while it is in the process of manufacture, and before it is pressed and dried, a metallic zinc powder, known in commerce as blue powder, in convenient quantity, about to the extent of one-half the weight of the dried paper. The paper is then run between the press rolls and over the drying cylinders in the ordinary manner. The zinc powder will adhere to the paper and be partly incorporated with it in greater or less quantity, as the sheet of paper pulp is more or less thick or more or less wet. The paper may also be sized with glue or starch and then dusted with the zinc powder, or the zinc powder may be mixed with the size or starch, and then applied to the surface of the paper by well-known methods.

The Victor Radiator.

Among the new forms of radiators for steam and hot water recently put on the market is the Victor radiator, offered to the trade by the Kelly & O'Hara Mfg. Co., 160 Broadway, New York, the radiator being the joint invention of Mr. Patrick J. Kelly and Mr. Thomas W. O'Hara. A general view of the double-loop radiator is shown in Fig. 1, while a sectional view of one of the loops is presented in Fig. 2, the latter illustrating by arrows the course of the steam. The radiator is constructed in sections, each consisting of one or more inverted U shaped tubes and a hollow base, the interior of the latter being divided into compartments, corresponding and connecting with the ends of the tubes. Each loop is cast in one piece, and the loops, we understand, are capable of being so joined together that either steam or hot water may be circulated through them in a di-

rect and continuous current. The steam, as shown, passes up one channel, down the middle, across the bottom, up the right-hand side and finally down again on the outside, and passes into the next section through the opening shown at the lower right-hand corner. In the next section the direction of the current is exactly the reverse, and the steam passes on to the third section from the opposite lower corner, the connections between the loops being at alternate corners. By referring to Fig. 1, it will be seen that the flow and return pipes are connected at diagonally opposite corners of the radiator. The claims made for this apparatus are that it secures a continuous and perfect circulation of the heating agent. Provision is made for collecting and carrying off the water of condensation by channels through the base, by which means it is prevented from flowing or obstructing the course of the steam through the tubes. The radiator illustrated consists of unornamented tubes, 2 inches square, set diamond-wise in direct rows. The sections, or loops, are connected together at the bottom by long bolts extending the entire length of the

Chicago Shippers and Pooling.

Shippers and business men generally in Chicago have conferred with reference to the proposed establishment of railroad pools, and, while there are some differences

no undue advantage over him, and business will seek its natural channels. The Interstate Commerce law could certainly be amended in many particulars where its operation is against the roads, which, on account of the local traffic, are prohibited from competing for through traffic. Whether an amendment sanctioning the formation of pools would cover this case is difficult to say. Under certain conditions it might do so, but the conditions would need to be tightly drawn and unbreakable." To the same effect is the statement of John V. Farwell, head of the house of John V. Farwell & Co., in which Senator Farwell is a partner, viewing the situation philosophically. "Rate cutting between opposing railroads is merely the natural adjustment of rates which have for some reason or other become excessive or disorganized," said he. "The public generally does not suffer much by it, but on the other hand the advantage is so slight it is

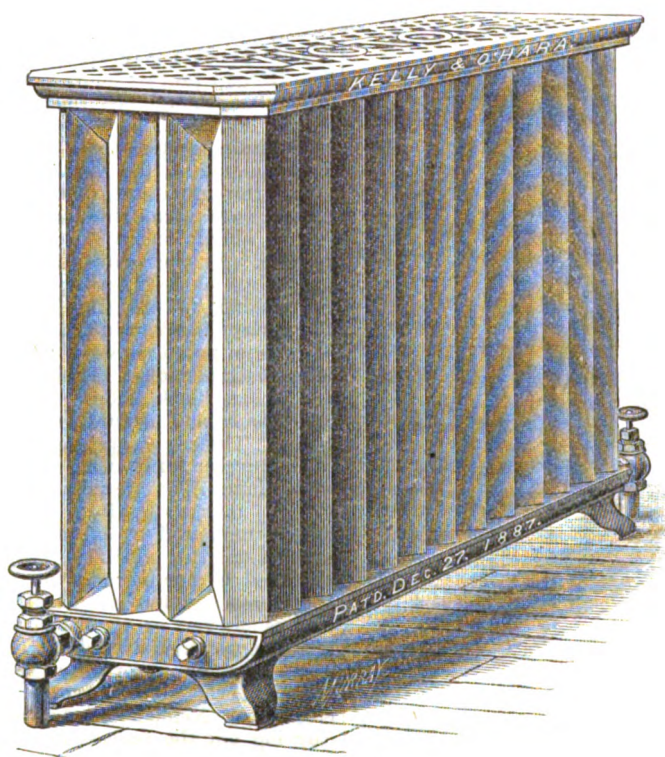


Fig. 1.—General View of Radiator.

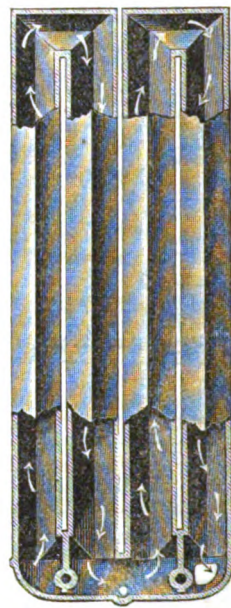


Fig. 2.—Sectional View of Loop.

THE VICTOR RADIATOR. THE KELLY & O'HARA MFG. CO., BROADWAY, NEW YORK.

rect and continuous current. The steam, as shown, passes up one channel, down the middle, across the bottom, up the right-hand side and finally down again on the outside, and passes into the next section through the opening shown at the lower right-hand corner. In the next section the direction of the current is exactly the reverse, and the steam passes on to the third section from the opposite lower corner, the connections between the loops being at alternate corners. By referring to Fig. 1, it will be seen that the flow and return pipes are connected at diagonally opposite corners of the radiator. The claims made for this apparatus are that it secures a continuous and perfect circulation of the heating agent. Provision is made for collecting and carrying off the water of condensation by channels through the base, by which means it is prevented from flowing or obstructing the course of the steam through the tubes. The radiator illustrated consists of unornamented tubes, 2 inches square, set diamond-wise in direct rows. The sections, or loops, are connected together at the bottom by long bolts extending the entire length of the

of opinion, the general sentiment is believed to be decidedly against their restoration. To meet the exigency caused by persistent rate-cutting certain amendments to the Interstate law are proposed, which Senator Cullom believes will receive the favorable action of Congress. They provide for giving three days' notice by railroads of an intention to lower rates, inflict heavy punishment upon shippers who underbill goods, and also make provision for the more speedy settlement of cases in court arising from a violation of the Interstate law. These amendments, it is said, were suggested by the Chicago Freight Bureau, which has 220 members, of whom one is the local Board of Trade. Among prominent firms expressing an opinion is that of Hibbard, Spencer, Bartlett & Co., wholesale hardware, who take the ground that "railroad wars are the result of competition carried to excess, and, like everything else which is overdone, are injudicious. An agreement between certain roads connecting the same points—say, for example, Chicago and St. Paul—is a benefit to the business community. A shipper then knows his competitor in business has

hardly worth mention. Business is certainly interfered with by this element of uncertainty, and a low rate, allowing a fair profit to railroads and breathing space to business men, would be better than any pools or combinations among railroads." Many other opinions of leading houses coincide.

Lake Copper Shipments.—The various Lake Superior copper mines have shipped refined copper as follows by lake during the season just ended:

	Pounds.
Calumet and Hecla	36,588,086
Atlantic	2,892,135
Allouez	50,000
Central	1,278,388
Tamarack	6,279,442
Osceola	2,321,626
Franklin	2,400,342
Huron	1,575,666
Quincy	4,541,569
Kearsarge	571,011
Copper Falls	975,036
Evergreen Bluff	26,888
Hilton	15,423
Ridge Copper Co.	50,806
Other tributors	7,797
Total	59,574,066

THE WEEK.

A consolidation of Southern timber interests has been formed which is said to control nearly all the timber cut on the South Atlantic Coast. The Southern Pine Company, recently formed, and the consolidated companies of Darien, in Georgia, are both under the presidency of Capt. J. H. Hilton, of New York.

Maine is no longer the "Pine Tree State," the cut of spruce being four times the output of pine, which has nearly disappeared, excepting far north, where Canadian and Western pine comes in competition.

Salt Lake City shipped, during a single week in November, 75 carloads of lead and copper ores, iron, slag and bullion, and the weekly receipts of late vary from \$90,000 to \$155,000 in value.

Four street railway lines in St. Louis have been purchased by Chicago capitalists for \$3,600,000.

Two more private tests of the new process known as electric sugar refining have been made. The crystals made are entirely different from any other. While some in the trade will "not be surprised to find it is all it claims to be," this opinion is not shared by all alike.

The Haytian Consul-General, Mr. Bassett, has been recalled. No reason assigned. Cuthbert Singleton is Consul *pro tem*.

Eleven iron bridges will be substituted for wooden ones on the New York, Providence and Boston Railroad, at a cost of about \$90,000.

President Gompers, of the American Federation of Labor, in his address before the Convention, at Cleveland, denounced Master Workman Powderly, and referred, in an unfriendly spirit, to the attitude of the Knights of Labor toward trades unions.

The police census of Albany makes the population 103,000.

Japan and Mexico have mutually signed a treaty of amity and commerce, through their respective ministers at Washington.

The competition of rival American-built railways in Mexico has induced heavy cutting of rates on European merchandise, to the detriment of export interests in the United States, and especially harmful to American manufacturing interests.

The Chicago Opera House, a supposed fire-proof structure of imposing appearance, caught fire from a calcium light and the interior was burned out, at a cost of \$50,000.

The officials of the Chicago, Burlington and Quincy Railroad Company adhere to their determination to make no vacancies among their new men in order to restore old men who struck.

The origin of cotton fires, which occur so frequently on "tramp" steamers, while they are comparatively rare in the coasting trade, forms the subject of a treatise by the president of a leading marine insurance company in Philadelphia. In consequence of this frequency insurance premiums have nearly doubled within a year in risks on cotton shipped from Atlantic ports to Liverpool, representing a sum equal to about \$1,250,000, which falls mainly on planters at the South. It is remarked that on steamers running coastwise loaded with naval stores and miscellaneous material, more combustible than cotton, only a single fire has occurred within about six years. The inference is that cotton fires on ocean tramps are of incendiary origin and the motive is assumed to be a desire to profit at the underwriter's expense. One remedy suggested is to insert in all charter parties and bills-lading a condition that in case of

fire aboard ship the underwriters shall have absolute control over the cargo.

It is stated that the docks and buildings of the Storage Company, at Girard Point, valued at over \$4,000,000, will be sold under foreclosure, and that the Baltimore and Ohio Railroad Company will bid for the property in sharp competition with the Pennsylvania Railroad Company, which holds many of the bonds.

A mammoth furniture factory is to be established at Little Rock, Ark., by citizens of Grand Rapids, Mich., and efforts are making to attract others from Northern points.

Thomas Longmore, pipe and tube manufacturer, of Walsall, England, who has been in Pittsburgh several days studying the American method of manufacturing pipe, has engaged two practical workmen to go to England, and intends to have improvements introduced in his works similar to those in this country.

The riotous scenes in Birmingham, Ala., last Saturday week are said to have cost merchants in that city \$250,000 as a consequence of the interruption of trade.

The annual report of the Chief of Treasury Special Agents shows a continued and remarkable increase in the amount of dutiable merchandise shipped without appraisement from ports of first arrival to ports of final destination under the Immediate Transportation act of 1890. The aggregate invoice value of merchandise forwarded in this way for each year since the system was established has been as follows:

1881.....	\$14,519,000	1885.....	\$25,860,000
1882.....	21,440,000	1886.....	29,255,000
1883.....	26,283,000	1887.....	37,017,000
1884.....	27,896,000	1887.....	38,929,000

The dutiable value of merchandise handled in this way has increased with even greater rapidity, rising from \$6,604,000 in 1881 to \$21,218,000 in 1888. The original entry of more than two-thirds of the importation has been at New York and the final delivery of more than one-fourth has been to Chicago, with Philadelphia, San Francisco, Cincinnati, St. Louis and Boston following in the order given.

The Boston Exchange is about to erect a ten-story building, to be occupied in part by banking and trust companies. It will have a frontage on State street of 171 feet. Peabody & Stearns are the architects.

The imports of raw sugar at this port have vastly diminished since the formation of the sugar trust. As there are no other buyers of any consequence, holders of sugar are compelled to accept such prices as may be offered in the absence of competition.

The total New York investments in Panama Canal stock are said not to exceed \$500,000. The canal dredgers from New York claim to be amply protected by collateral.

The President elect, General Harrison, signifies, in response to an invitation from the committee, that he will probably be able to participate in the Centennial Celebration of the Inauguration of George Washington as President of the United States, to take place in this city, April 30, 1889.

The American contractors who have entered into engagements with the Government of Chili for extensive railroad building in that country have already made a beginning of that work. More than 600 miles of railroad must be finished within five years, and the most important branches or laterals in a shorter time. The latter penetrate spurs of the mountainous range parallel with the seacoast to directly connect the interior with the several ports

on the seacoast. The agreement permits the importation of 1000 skilled artisans and a much large number of common laborers if the local resources prove inadequate. Large quantities of bridge material must also be imported, besides rolling stock, costing altogether some \$3,000,000 or \$4,000,000. The president of the South American Construction Company, as it is called, is Gen. G. S. Field, formerly at the head of the Union Bridge Company, which built the cantilever bridge at Niagara Falls and the structure across the Hudson River at Poughkeepsie. The vice-president is Col. Newton D. Lord, the resident representative of the company in Chili, and Frederick Leach is the chief engineer of construction. The contract is for the building of bridges, stations, machine shops, and everything complete for operation.

The Missouri Pacific has practically abandoned its shops at Sedalia, Mo., since the road went into the hands of a receiver, and new ones are now to be built at Atchison, Kan. The city votes \$100,000 for the purpose.

The North German *Gazette* contends that the Empire must support the German Trading Company in its conflict with the Arabs in East Africa, on the ground that all foreign traders on that coast will derive advantage from their success.

An American company has obtained from the Mexican Government concessions for the introduction of water, fuel and gas into all the cities and Government buildings throughout the Republic.

Three Canadian Pacific steamers, together carrying 5,250,000 pounds of tea and 760 bales of silk, besides general cargo, have lately arrived at Vancouver after about 14 days' average passage from Yokohama. A single steamer makes the coast connections.

The Charleston Cotton Exchange is of the opinion that with new and improved machinery the manufacture of pine-straw bagging will become one of the most profitable industries in the South.

A convention representing every Southern State passed resolutions, at Montgomery, 13th inst., designed to attract Northern immigration, mechanics and laborers, men of energy and enterprise, to engage in manufacturing and in other ways develop the immense resources of that part of the United States.

It is understood that a large contract for firearms made in this city on account of the Legitimate Government in Hayti is being filled at the rate of 1000 stand by each semi-monthly steamer.

The Polytechnic Institute in Brooklyn has purchased the old Dutch Church, on Joralemon street, for \$325,000, and will probably build an extension.

Since the establishment of a course in electrical engineering at Tuft's College, in Boston, the accessions to the number of students in that department is so large that ample material is at hand for building up a flourishing technical school.

The window-glass factories have increased so rapidly in the West that efforts are making to form a pool to control production.

The entire sum of \$11,500,000 has been subscribed for the contemplated Merchants' Bridge, at St. Louis, and contracts will soon be made.

Among the Departmental Decisions for October and November, announced by J. Johnson, of the Canadian Customs Department, is one that the rate on galvanized wrought-iron tubing over 2 inches in diameter is 30 per cent. ad valorem.

MANUFACTURING.

Iron and Steel.

The Keystone Iron Works, Limited, of Reading, Pa., closed down their entire plant on the 1st inst., on account of a lack of orders. In the meantime repairs are being made, which will take about one month to complete.

The new steel plant of the Phoenix Iron Company, at Phoenixville, Pa., was completed on the 12th inst., and the final test of the engines and roll train was made on the morning of the 18th inst. Engineer John Ferguson, of Pittsburgh, was in charge of the work of erecting and testing the engines. These engines weigh 370,000 pounds, and the roll trains weigh 400,000 pounds. The engines have 2000 pounds pressure, and the plant is expected to turn out steel suitable for armoring cruisers for the Government and for making steel guns of any caliber. The plant was put in operation on Monday, the 17th inst., for the purpose of working down the bearings.

The blast-furnace employees of the Mahoning Valley, Ohio, have received an advance of 10 per cent. in their wages, taking effect on the 1st inst. The advance was voluntary on the part of the operators.

The new Soho Furnace of the Moorehead-McCleane Company, at Pittsburgh, which was put in blast on November 15 last, is turning out about 225 tons of foundry pig iron per day. This is a larger output than was anticipated for it by the owners.

The report that the National Tube Works Company, of McKeesport, Pa., had purchased the plant of the Alikanna Rolling Mill, near Steubenville, Ohio, is officially denied by that company.

The South Chicago rail mill of the North Chicago Rolling Mill Company will be kept in operation through the winter, and will probably not stop for repairs until March or April, to avoid tearing up in cold weather.

The Union Steel Company, of Chicago, have on exhibition in their office a very handsome specimen of the steel from which they manufacture rails. It is in the shape of a piece of a 70-pound rail, of the Rock Island section. It is 14 inches long and beautifully polished, with not a flaw in its surface, and was planed from an ingot which had not been annealed.

The Scranton Steel Company, Scranton, Pa., on Thursday night, December 13, bloomed 401 ingots in one turn of 12 hours, being idle one hour of the time changing rolls.

The Glamorgan Company, of Lynchburg, Va., are now building another cast-iron pipe foundry, with a daily capacity of 20 tons. They will run on 8-inch, 10-inch, 12-inch, 16-inch and 18-inch sizes, and hope to be ready for work early in the new year.

Blanche Furnace, of the Etna Iron Works, at Ironton, Ohio, was lighted up on Saturday, the 8th inst., and on the following Tuesday the cast of six beds of iron was very satisfactorily and successfully made. The furnace is now working very satisfactorily on native and Missouri ores, and Fire Creek and Connellsville coke.

Belmont Furnace, of the Belmont Nail Company, at Wheeling, W. Va., produced 3400 tons of Bessemer pig iron last month.

The Suburban Wheel Mfg. Company, recently organized at Pittsburgh by capitalists of that city, have decided to locate

their plant at Bissell, on the Baltimore and Ohio Railroad, about 20 miles from Pittsburgh. It is expected that work on the new buildings will be commenced in a short time.

The 24-inch department of the plant of the National Tube Works Company, at McKeesport, Pa., which closed down several weeks ago on account of a falling off in the demand for that size of pipe, has again resumed operations.

One of the blast furnaces of the Glendon Iron Company, at Easton, Pa., which has been undergoing repairs for several weeks past, was blown in last week. Two more idle stacks belonging to the same firm are being prepared for blast.

The new pipe mill of the Reading Iron Works, at Reading, Pa., which closed down several weeks ago, has again resumed operations.

Three-quarters of the large iron ship-building plant of the Globe Iron Works, in Cleveland, was destroyed by fire on the 8th inst. The burned portion of the shipyard was 700 feet in length and 50 feet in width, and it contained \$100,000 worth of valuable machinery. Valuable models and drawings, the accumulation of years, were ruined. Four large steel vessels in process of construction were saved from damage. The loss is approximately fixed at \$200,000, and it is probably covered by insurance. The rebuilding of the plant will begin as soon as the insurance is adjusted.

Stack No. 5, of the Allentown Iron Works, at Allentown, Pa., was blown in on Monday, the 10th inst., after being re-lined, and otherwise thoroughly repaired. The stack was blown out for repairs about a month ago. There are now two stacks in blast. The furnace property has been transferred to the Allentown Terminal Company, by whom it was purchased six weeks ago. As soon as the transfer was made George F. Baer, of Reading, was elected president, and Mr. Alfred Broden, superintendent of the Coal and Iron Company's furnaces, was chosen general manager of the Allentown Iron Company.

At a recent meeting of the directors of the Catasauquus Mfg. Company, of Catasauquus, Pa., Mr. James W. Fuller, of that place, was elected to fill the vacancy caused by the death of Mr. Fisher Hazard, of Mauch Chunk, who had been a member for many years.

The statement was made in our last issue that the Chicago Crucible Steel Casting Company had been obliged to tear out their steel melting furnaces because they had found the system on which the furnaces were constructed to be a failure. The designer and builder of these furnaces is J. Zellweger, of 162 La Salle street, Chicago. He controverts the assertion of the company and denies that his system of gas producers is a failure. Their unsatisfactory performance at these works was the result of experiments made against his advice, and through which the furnaces were overheated and burned out. In defense of his furnaces he cites their satisfactory use for various industrial purposes at the Joliet Steel Works, the works of the Ajax Forge Company, the Fowler Steel Car-Wheel Company's works, the Atkinson Car-Spring Works and the factory of the Elgin Watch Company. The last-named company have used these furnaces since 1881. Mr. Zellweger is now putting in his third order for furnaces for the Ajax Forge Company. These facts are mentioned in simple justice to Mr. Zellweger, as his furnaces are known to have been adopted by the steel casting company, and it might be presumed by those not familiar with his gas-producing system that its success had not been demonstrated anywhere.

Machinery.

On Thursday, the 18th inst., a charter was issued to the Altoona Mfg. Company, of Altoona, Pa., with a capital stock of \$100,000. The stockholders are: W. A. Green, John Lloyd, E. T. Kerns, George P. McCullom and G. W. Stratton, of Altoona, and John Reilly, of Philadelphia. The company are authorized to manufacture engines, boilers and cars.

F. D. Buttricks, engineer and machinist, New Haven, Conn., has recently added to his business the making of hardened steel rolls for rolling wire.

The partnership heretofore existing between W. P. Duncan, W. R. Jenkins and J. H. Lingle, trading under the firm name of W. P. Duncan & Co., at Bellefonte, Pa., was recently dissolved by mutual consent, W. P. Duncan withdrawing. The business of the firm will be conducted by W. R. Jenkins and J. H. Lingle, under the firm name of Jenkins & Lingle.

Morse, Williams & Co., Philadelphia, are having erected an electrical apparatus with sufficient power to light their entire manufactory. The lights will be of the incandescent system.

The Betts Machine Company, Wilmington, Del., have recently shipped one of their improved horizontal boring and drilling machines to the Louisville and Nashville Railroad Company, at Decatur, Ala.; one of their 60-inch planers, weight 36,000 pounds, to Wm. Deacon, San Francisco, Cal.; one of their 10 x 16 feet boring and turning mills, 62,000 pounds, to the Bouton Foundry Company, Chicago, Ill., and will ship in a few days two of their heavy frog planers, 60,000 pounds, to the Ramapo Iron Works, Hillburn, N. Y.; one of their 7 x 10 feet boring and turning mills, 34,000 pounds, to Byron Jackson, San Francisco, Cal., and a 48-inch radial drill to Williamsport parties.

The National Pipe Bending Company, of New Haven, Conn., report a large trade for the fall and winter months, over 30 of the National feed water heaters being sold in November. Among the sales were one of 1000 horse-power, two of 500 horse-power, one being for the new electric station in Baltimore, and one to the Cambridge, Mass., Electric Light Station, where over 1000 horse-power of the National heaters are in use. The new Boston Electric Light Station has also just been equipped with the National feed water heater. The coil work for December exceeds that of any month during the year, and they have a large number of orders unfilled.

Contracts were recently awarded to the A. A. Griffing Iron Works, Jersey City, by the Lighthouse Board for furnishing radiators and air valves, and to Amos Aller, of New York City, for automatic traps and swinging check valves. C. H. Delamater & Co., of New York, were also awarded the contract (at \$1850) to furnish a surface condenser for the lighthouse tender Gardenia.

All possible haste is being made in the erection of the new air-brake shops of the Westinghouse Air Brake Company, at Wilmerding, on the Pennsylvania Railroad, about 11 miles from Pittsburgh. The Philadelphia company is laying a new 8-inch gas line to the site, and it is thought that by spring everything will be ready to start. Bad fall weather has delayed work on the building, but already the boiler shop is ready for roofing. The works will be very large, of brick, and the machine shop will be two stories high.

In the course of a few weeks the Butler Mfg. Company, of Butler, Pa., manufacturers of the Ball engines, will have their establishment at that place in full operation. T. M. Shearer is the president and general superintendent; H. S. Gibson, treasurer; O. M. Russell, secretary, and

R. H. Ferguson, general agent. It is the purpose of the stockholders to form a limited company. They have already invested \$22,000 in the plant, and have almost completed one shop 50 x 105 feet, a foundry 40 x 60 feet, and will soon have a blacksmith shop 50 x 100 feet. The Ball engines and boilers were formerly manufactured at Bradford, but Butler's advantages attracted the company, and, although the buildings are not entirely ready, four engines are being made each week.

William Tod & Co., Youngstown, Ohio, have just completed a new brick tool room and stock house, and started two new lathes and a 60-inch Sellers planer. They are also building for their own use a hydraulic press with 10-inch ram, and a very heavy pit lathe for boring and turning large wheels.

The Chase Machine Company, Cleveland, have about completed their new building on Elm street, and they will soon be ready to enter into the manufacture of the Chase fog whistle machine, and do a general jobbing work in their business. The officers of this new enterprise are G. C. Barnes, president and general manager; James L. Chase, vice-president, and J. H. Ball, secretary and treasurer.

Hardware.

J. W. Bookwalter & Co., Springfield, Ohio, announce that they have sold and conveyed to the G. S. Foos Company, of that city, their good-will, stock, patents, patterns and business. The G. S. Foos Company will take immediate possession, and continue the manufacture of the same lines of goods, and will also fill all contracts made with the trade for the coming year by J. W. Bookwalter & Co. There will, therefore, be no change in the business except as to its ownership. The G. S. Foos Company is composed of G. S. Foos, William F. Foos, Robert H. Foos, A. L. Slager and Geo. D. Leedle.

Announcement is made by E. B. Williamson, receiver of the Dodd Mfg. Company, that he will offer for sale at Newark, N. J., the patents of the company for improvements in shutter workers.

The Bromwell Brush and Wire Goods Company, of Cincinnati, Ohio, have been compelled to largely increase their plant, owing to the demand for the specialties they manufacture. Their new additions will be completed in January, when they will be running a full complement of 400 hands. Their capacity for turning out painted wire cloth will thus be largely increased.

Kidd Steel Wire Company, Simonton & Co., sole agents, Pittsburgh, Pa., advise us that they are now manufacturing polished Drill Rods at their factory at Har-marville, Pa. Mr. Kidd, the manager of their factory, has been in the employ of a Pittsburgh rod establishment since his arrival in this country, and previous to that time was employed in one of the large manufactories in England. The rods manufactured by the company are used for twist drills, small taps, reamers, punches, watch parts, dental tools, &c., and are referred to as a superior article. They are drawn to micrometer caliper, and accuracy and uniformity are guaranteed. It is stated that the finest grade of special cast steel imported from Sheffield is used.

The New Haven Wire Goods Company, New Haven, Conn., advise us that they have been in operation since last May, and include among their stockholders Hon. H. B. Bigelow, ex-Governor of the State; Hon. S. E. Merwin, Lieutenant-Governor elect; Frank H. Hooker, of Henry Hooker & Co.; Ely Whitney, Jr., and H. C. Warren. W. C. Perkins, formerly superintendent of the Wire Goods Company,

Worcester, Mass., is superintendent of the company, and Wm. H. Bradley, recently secretary of the Whitney Arms Company, secretary and treasurer. The company have a finely equipped factory with the latest improved machinery, and are prepared at all times to furnish estimates for Wirework of any kind or quantity. They are manufacturing at present a full line of House-Furnishing Kitchen Utensils from Wire, and are preparing additional specialties, which will soon be put on the market.

The Wheeling Hinge Company, of Wheeling, W. Va., recently made a shipment of a carload of bridge irons to Lexington, Ky. This firm make a specialty of this work, and are prepared to furnish, on short notice, any quantity of nuts, bolts, rods and all irons used in the construction of wooden bridges.

The Globe Lock Works, at Norristown, Pa., was completely destroyed by fire on the night of the 10th inst. The company inform us that they have made arrangements to resume manufacturing their goods about the 25th inst., and expect to fill all orders promptly.

Miscellaneous.

Among corporations recently authorized to transact business in the State of Illinois are the following: Indiana Coal and Coke Company, of Chicago; capital, \$150,000; incorporators, D. C. Butts, John Klos and F. A. Holmes. Wyoming Oil and Mining Company, of Chicago; capital, \$1,000,000; incorporators, J. W. Rumsey, T. S. Moffatt and N. M. Harris. Colby Hardware and Electric Company, at Chicago; capital, \$50,000; incorporators, F. K. Biggs, Charles Longbridge and H. L. Forbes. Red Rock Copper Company Chicago; capital, \$300,000; incorporators, Nathan B. Lewis, W. S. Bailey and W. Knox Haynes. Bessemer Spike, Nail and Staple Company, Chicago; capital, \$500,000; incorporators, William T. Egan, W. Eldridge and A. Mitchell. Sheet Steel and Iron Post Company, East St. Louis; capital, \$500,000; to manufacture steel and iron posts; incorporators, Samuel N. Terry, John P. Keiser, Arthur J. Judge and Warwick M. Hough.

During the present week contracts will be let by the Pennsylvania Railroad Company for the building of 1000 gondola and stock cars. It is stated that bids have been received by the company from every car shop in the country for the order. The railroad officials will divide it up among half a dozen different companies, so as to get some of the cars within two or three weeks. All of the cars will be of a carrying capacity of 60,000 pounds each, and will be pressed into service as soon as made. They will be scattered to different points along the Pennsylvania lines west of Pittsburgh. The box cars will cost on an average of \$450 each, and the gondolas about \$285 each.

The Fort Payne Coal and Iron Company have been organized with Hon. D. H. Goodell, Governor-elect of New Hampshire; Hon. Henry B. Pierce, of Boston; Hon. Selden Connor, ex-Governor of Maine; Hon. Joseph W. Spaulding, of Portland, Me.; Hon. F. G. Jillson, of Providence; Horatio Adams, of Boston; W. J. Cameron, president of the First National Bank of Birmingham; John B. Boddie, vice-president of the Board of Trade, Birmingham, Ala.; W. P. Rice, president of the Union Investment Company, Kansas City, Mo., as directors, and with a capital stock of \$5,000,000. The directors organized as follows: Hon. J. W. Spaulding, president; Hon. D. H. Goodell, first vice-president; Hon. Henry B. Peirce, second vice-president; C. L. T. Stedman,

of Boston, secretary; F. H. Tobey, of Kansas City, treasurer and assistant secretary. It is the intention of these gentlemen to begin immediately to develop the property of the company, near Birmingham, Ala. It is not the intention of the company to give their first attention to the manufacture of iron. Coke will be the first product. One hundred ovens will produce about 350 tons of coke per day, and as soon as these have been erected several hundred more will be added.

The Union Ferry Company, of Brooklyn, have contracted with the W. & A. Fletcher Company, of this city, for a steel ferry-boat, which it is intended shall be the finest vessel of this description which has yet been built. The hull will be built at Newburg by T. S. Marvel & Co. The dimensions of the hull are about 209 feet over all, depth of hold 16 feet. The hull, with the exception of the decks, will be built entirely of steel, the plates of $\frac{1}{4}$ inch thickness, with a double strake of $\frac{1}{4}$ -inch plating 42 inches wide. The hull will be divided into five iron water-tight bulkheads, three athwartship and two longitudinal. The engine will be of the jet condensing beam pattern, and the diameter of cylinder 48 inches, with a piston stroke of 10 feet. The boat will be equipped with double-acting fire pumps, and will be lighted with electricity, and the entire cost will be about \$120,000.

Busy days have come again to Roach's shipyard, at Chester. The frame furnaces were lighted several days ago and the sheet furnace was started last week. The blocking used in building the United States cruiser Chicago is being torn down and relaid for the new Mallory and Ocean Line steamships, for which contracts were recently made.

Good Work by Boiler Inspectors.

Below we present a statement showing the work of the inspectors of the Hartford Steam Boiler Inspection and Insurance Company during merely one month. Total number of inspection trips made during the month of August, 1888, 4299; boilers examined, 8026; boilers inspected internally, 8884; subjected to hydrostatic pressure, 565. In all there were reported 7341 defects, which led to the condemnation of 46 boilers. The analysis of defects is given below:

Nature of defects.	Whole number.	Dangerous.
Cases of deposit of sediment.	517	35
Cases of incrustation and scale.	843	49
Cases of internal grooving.	28	13
Cases of internal corrosion.	339	30
Cases of external corrosion.	487	40
Broken and loose braces and stays.	86	15
Settings defective.	151	20
Furnaces out of shape.	243	12
Fractured plates.	145	30
Burned plates.	135	20
Blistered plates.	190	9
Cases of defective riveting.	2,001	329
Defective heads.	66	27
Serious leakage around tube ends.	1,275	161
Serious leakage at seams.	285	56
Defective water gauges.	118	21
Defective blow-offs.	54	6
Cases of deficiency of water.	10	5
Safety valves overloaded.	44	17
Safety valves defective in construction.	42	9
Defective pressure gauges.	263	53
Boilers without pressure gauges.	11	2
Unclassified defects.	49	5
Total.	7,341	963

The good work done by the scientific experts of these companies in averting danger to life and property is ample return for the small premium charge, even if they did not offer substantial indemnity for possible disaster.

The Iron Age

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DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

President Adams on the Railroad Situation.

Charles Francis Adams, president of the Union Pacific Railroad, has had the courage to characterize in vigorous language the business methods of many railroad managers. In his now famous speech at the meeting of the Commercial Club, in Boston, he said:

That the general railroad situation of the country is at present unsatisfactory is apparent. Stockholders are complaining; directors are bewildered; bankers are frightened. Yet that the Interstate Commerce act is in the main responsible for all these results remains to be proved. In my opinion the difficulty is far more deep-seated and radical. In plain words, it does not lie in any act of legislation, State or National; and it does lie in the covetousness, want of good faith, and low moral tone of those in whose hands the management of the railroad system now is—in a word, in the absence among them of any high standard or commercial honor. These are strong words, and yet, as the result of a personal experience stretching over nearly 20 years, I make bold to say they are not so strong as the occasion would justify. The railroad system of this country, especially of the region west of Chicago, is to-day managed on principles which—unless a change of heart occurs, and that soon—must inevitably lead to financial disaster of the most serious kind. There is among the lines composing that system an utter disregard of those fundamental ideas of truth, fair play and fair dealing which lie at the foundation not only of the Christian faith but of civilization itself. With them there is but one rule—that, many years ago, put by Wordsworth into the mouth of Rob Roy:

"The simple rule, the good old plan,
That he shall take who has the power,
And he shall keep who can."

* * * * *

The construction of all these miles of railroad, for which hardly any immediate demand existed, made a readjustment of traffic necessary. That is, the moment the roads were finished the problem passed out of the hands of the engineer into the hands of the freight agent, by whom traffic of some sort for the new roads had to be provided. The Interstate Commerce act was in operation. It was impossible to pool, and the long haul regulated the short haul. Then followed a depth of railroad morals among freight agents lower than had even previously existed—and that is saying much. The dishonest methods of rate-cutting, the secret systems of rebates, the indirect and hidden payments made to influence the course of traffic resorted to or devised during the last two years I do not hesitate to say are unprecedented in the whole bad record of the past. In this respect I indorse every word of indignant denunciation which Judge Cooley, of the Interstate Commerce Commission, is reported to have recently uttered. Names of members or employees of firms whose business it was desirable to secure, but to whom it was unlawful openly to allow a rebate, have been put upon the pay rolls of companies at salaries equal to the estimated amount of what the rebate would have been; where the influence of a particular person was thought necessary to secure certain shipments, he has been advised that the company wished to consult him, but in order that it might do so more conveniently he must live in a house in a certain quarter—and the rent of that house has been paid by the company;

where it was thought expedient to cut the rate on passenger tickets to a given point without affecting the rates to intermediate points under the Interstate Commerce act tickets to that point have been placed by the hundred in the hands of "scalpers," and they were allowed a commission equal to half the price of the ticket. This commission, the allowance of which the act did not specifically forbid, the "scalper" again shared with the purchasers of the tickets.

Mr. Adams's remarks have called forth a chorus of indignant protests and have caused some personal attacks. Yet the majority of business men, if they are frank, will confess that his denunciation comes pretty close to the truth. The restrictions of the Interstate Commerce act have furnished an additional incentive to underhand practices. The efforts to evade them have put a premium on dishonesty and fraud, and has had a demoralizing influence upon business. It is not our object to inquire now into the question to what extent this state of affairs has reacted upon the morals of the business community itself. Suffice it to say that to a lesser degree his charges apply largely to many branches of trade and manufacturing, especially so far as engagements between men in common pursuits are concerned.

Mr. Adams is inconsistent, however, when, after picturing how the Interstate Commerce law is evaded, he attributes to it an influence prejudicial to the country, to the trade and to the railroads. He is not logical when he dwells on the evils of overbuilding, which was done by the large companies, and, in the next breath, insists that the law in question tends to lead to the aggregation of railroad business in a few large groups. Mr. Adams argues that since it is the long haul which brings the profit, and, since the law against pooling has deprived the smaller lines of the business conceded to it formerly, under the now prohibited arrangements, that, therefore, the smaller lines are being forced into the maws of the few great systems into which the railroads of the country are rapidly crystallizing. Now, it has been generally understood that the "smaller lines" were, under the old pooling system, allowed business in proportion to their capacity for doing mischief, and that, in reality, they got more, usually, than they were entitled to. Persistence in the old policy on the part of the weaker lines would probably be as fatal as Mr. Adams insists that it would be. But, if their managers develop resources hitherto neglected and abandon old methods, all will be benefited.

Speaking of the influence upon trade of the law, Mr. Adams says:

Next came the long and short haul clause. Just as the small, local railroads are crushed out of existence by the anti-pooling clause, so the local points of distribution and second-class business centers throughout the country find themselves, because of the long and short haul clause, unable to compete with the great commercial centers. Traffic, under the provisions of the act, must inevitably seek the railroad having the long haul to the most distant and largest center. The operation of the law in this respect is now beginning to make itself felt upon the smaller distributing points. They are deprived of their markets, for those who formerly bought of them can get the same goods on better terms from the larger and more distant centers. The old local system of distribution is broken up in favor of the centralized system. This fact is now making itself apparent to the manufacturers and jobbers of the smaller cities or towns as against Chicago, St. Louis or Cincinnati; but, as sure as the law of gravitation applies to all places

and works under all circumstances, this same long and short haul clause will next make itself felt against Chicago, St. Louis and Cincinnati, and in favor of New York. In other words, contrary to every design of those who framed the act, its provisions have lent a new impetus to just those forces which it was intended to hold in check. Instead of building up the local road and the small distributing center, it is working the sure destruction of both. An artificial, but most powerful, impetus has thus been given to the process of centralization.

Evidence is somewhat contradictory on this point. It has been stated, on the contrary, that small distributing centers have increased in number and importance during the past two years. It is not unreasonable to suppose that where that tendency has been obliterated by the movement to which Mr. Adams alludes, it may have been the result of the very methods which he denounces so vigorously.

Forgeries in Checks.

Recent instances of forgery in New York have raised some interesting questions as to the responsibility of the parties who have handled the paper. Who must bear the loss—the bank that paid the money or the depositor whose name is forged, or whose name is on the forged check? Can the depositor compel the bank to pay back to him the money advanced? Usually in the case of a forged check or draft, where the signature of the depositor or drawer is a forgery, there can be no question as to the liability of the bank. The bank is bound to know the true signature of its depositors, and no matter how skillful or deceptive the forgery may be, it pays the money at its own risk, and on the judgment of that bank officer whose duty it is to determine the genuine or false character of the paper. The bank, under these circumstances, must suffer the loss and repay the money. There is no difference of opinion about this in the adjudications of the American States or of Europe. And the reason seems to be good why such should be the case. The principle on which the banks are held in these cases is that it would be wrong to make an innocent depositor responsible because the bank made a mistake. The bank is responsible for the acts of its officers and clerks, and not the people who deal with it.

But there is a class of cases where there might perhaps be considerable doubt about the law, and question as to the liability of the bank. That is, where the signature of the depositor is genuine, but the name of the payee or indorser has been forged on the back of the check. Before the check is indorsed by the payee, or even sometimes before it comes into his possession, it is wrongfully appropriated and the payee's name is forged, the check is presented at the bank and paid, and the question is who must suffer—must the bank lose the money, or the depositor? There is hardly the same duty in this case for the bank to know the signature of an indorser who is not a depositor, and it might be argued that it would not be fair or for the best interests of business policy to impose so heavy and serious a responsibility upon the bank. On the other hand, when the bank is directed to pay to a certain person it would seem that it should not be protected if it paid to any other person. It must satisfy itself that the indorsement is correct. At

all events, whichever of these two views is the more logical and sound, the latter is adopted and is settled law in New York. And as a matter of fact and common practice the banks do require that the person making the indorsement be identified or that the check be presented by some depositor in whom the bank has confidence. If the check is indorsed in blank, of course, it makes no difference how many subsequent indorsements are made upon it. They may be all forgeries, yet the bank in that case may make the payments to any holder of the paper in safety. If the check is indorsed specially to the order of some person named, however, then the bank must take the same precautions as to the signature of that person as in the case of the original payee.

This is the rule in New York and in most, if not all, of the other States, but under a statute known as the Bills of Exchange act, passed a few years since in England, the opposite rule prevails in that country. The only signature the bank is bound to recognize is that of the depositor, and it may pay to any holder just the same as if the check was made payable to bearer in express terms. A check becomes in reality, no matter what is stated in it or to whom it is made payable, an order to pay money to the holder on demand. Several European and South American countries have adopted this principle in their codes. The facts of the case referred to in New York as a startling instance of forgery involve questions of considerable interest and importance. The general rules of law relating to forgery apply, of course, to the case, but they may possibly be affected in their application by the fact of the relations between the forger and the makers of the checks. The forger was a trusted employee of the firm of lawyers who drew the checks. They employed him to conduct negotiations of considerable magnitude in connection with real estate transfers, and he had practically full control of this branch of the business. When a mortgage loan was to be made by some client of the firm the firm would draw their check to the order of some fictitious person whose name the forger would give as the intended borrower and owner of the property, and this check was then delivered to the forger to be given to the supposed borrower or mortgagor. The papers being regular, no suspicion of the true state of the case arose.

The name of the fictitious payee was indorsed on the check and it was eventually paid by the bank, after having passed through the account of a person friendly to the forger and whose account was kept in another bank. These forgeries amounted to over \$225,000, and the law firm was obliged to repay this amount to their clients, who had intrusted it to them for investment. The question now arises, can they recover back this amount from their bank, which paid it on the faith of their own checks, the indorsement being the only forgery on the paper. There is, of course, no doubt that the indorsement of a fictitious name is a forgery, quite as much as the forgery of the name of some person really in existence and intended as the payee. But in this case the forger was the trusted clerk of the firm. And it will be said in defense of the bank that under the rules of law

governing the responsibility of employers for the acts of their employees the former should be held responsible for the acts of their clerk whom they selected and trusted and to whom they gave the power and opportunity to perpetrate the forgeries. This rule would not go so far as to relieve a bank from liability in a case where the depositor's signature was forged by his clerk, but it is claimed that here, where the signature was genuine the bank under the circumstances should not be held. The question is an interesting one, as it is likely to occur in the experience of many others. But it would seem from the decisions that the bank cannot avoid liability. Whether the depositor was in reality more in fault than the bank does not affect the question, as the bank had no right to pay money on a forged indorsement.

Direct Ship Propulsion.

Promises of impossible engineering performances to be achieved by modifications of methods tried and discarded in years past, though not so known perhaps to the public at large, have, of late, been made with almost noteworthy frequency. Thus, schemes for the propulsion of ships by jets of live steam, water under high pressure, and by the direct action of explosions of gaseous mixtures, have successively been brought forward, and if their projectors have not derived much satisfaction from them, it has assuredly not been through any lack of rose-colored newspaper accounts.

So far as we are aware, the last attempt to popularize direct steam propulsion was made—unsuccessfully, as may well be imagined—about two years ago, and from appearances would seem to have been wisely abandoned, at least for practical work. For propelling small toy boats the method, to our knowledge, was employed many years ago, and possibly is still in use. Closely allied to it—in fact, the same in principle—is the system of hydraulic propulsion, in which jets of water under high pressure are forced through pipes in the stern of the vessel, causing forward motion through reaction. Just why this system should have survived the other, it is difficult to tell, there being, it is true, a slight gain in efficiency in one respect, though this, it would seem, is counterbalanced by the greater complication of the necessary machinery, in the way of pumps, as compared with simply the boilers required in the other case to supply the steam jets. Evidence of the faith which is still put in it, however, has more recently been given by the building at South Brooklyn, N. Y., of a vessel in which it is proposed to again apply the system. As currently described, the vessel measures over all about 110 feet, and has a 28-foot beam, the draft being about 4 feet. A suitably placed nozzle in the stern post will discharge a comparatively small stream of water, 1½ inches in diameter, at very high pressure—10,000 pounds per square inch, so the report has it—and the speed, it is modestly stated, will be 30 miles per hour. The horse-power to be developed is placed at 1500. The whole thing, of course, is represented as an assured success, completely revolutionary in character. In considering the subject from a more matter-of-fact standpoint we

will take the following formula given by Professor Wood in a discussion of the jet propeller in his work on "Analytical Mechanics" for the mechanical power developed per second:

$$Pu = \frac{W}{g} (\sqrt{u^2 + v^2} - u) u$$

In this W represents the weight of water to be discharged, v the velocity of the jet due to the pressure, and u the velocity of the vessel. Theoretically the velocity of the jet v should equal the speed u of the vessel, which in the present case at 30 miles per hour corresponds to 44 feet per second. Taking the given figures, substituting them in the formula and transposing, we have

$$W = \frac{1500 \times 550}{(\sqrt{44^2 + 44^2} - 44) 44} \times 32 = 33259.4$$

pounds. This represents about 17 tons per second, or over 61,000 tons of water per hour to be forced out through the orifice in the stern of the ship. Figuring out the horse-power on the basis of this weight of water and the enormous pressure, the result will be found to run up entirely beyond realization. The claims made are preposterous, and any figures based on them must, of necessity, be likewise. Considering the weight of water required for the jets for this method of propulsion it may readily be inferred that the quantity of steam necessary to produce the same effect by the direct steam propulsion system, to which we have already referred, would be something enormous, and the requisite amount of coal to generate this steam could scarcely be carried by any vessel. The efficiency of the jets, moreover, is very low, and only the momentum is utilized, all the work in the heat being wasted.

Propulsion by the direct action of petroleum vapor explosions is aimed at in another vessel recently launched at Brooklyn. The machinery is described as consisting of a series of heavy steel cylinders, the ends of which open into the water. In these cylinders explosive mixtures of air and sprayed petroleum are to be fired by electric sparks, continuity of action being obtained by having a number of such explosion chambers in which the discharges will occur in regular rotation. Simplicity, directness and economy are the claims made for the system, though they yet remain to be substantiated. Past experience has, if anything, been discouraging to the development of such projects, and there is no indication now that they will gain any hold upon users of engines for ship propulsion.

We owe it to the *Evening Post* to print the somewhat reluctant and tardy acknowledgment of their error. It is true they did not accord to it the prominence which they gave to their attacks upon *The Iron Age*, but attached it as a rider to a letter written to it by Julius Jonson, of the Jonson Foundry and Machine Company. The comment to that letter reads as follows:

The Iron Age, in its issue of November 29, says: "The *Evening Post* misrepresents us when it states that we claim that the duty is not 1½ cents per pound, but is 45 per cent. ad valorem. Our position was that the business was impossible at 1½ cents per pound duty, and that therefore those who imported the castings must necessarily make the effort to secure the 45 per cent. ad valorem rate." By looking at back numbers of *The Iron Age*, we

find that this contention is correct. We might take serious objection to the remissness of a trade journal which holds out the view that a contract of some importance in a political point of view has been made, when no such contract exists, but it is not worth while to reopen the subject.

Measured by the standard of its apology, the conscience of our contemporary is easily satisfied.* In the struggle between the necessity of telling the truth and of maintaining the attitude of infallibility, the former has been victorious, but it has been apparently a narrow escape. A spirit of lofty criticism is intended as a cover of an ignominious defeat. The effort may succeed with some of its readers, but it will not efface the convictions, unfortunately for the *Evening Post*, which its course has created in the minds of those who are connected with the iron and steel trades.

The Panama Canal Fiasco.

Ferdinand de Lesseps's great Panama Canal scheme is at last in a state of financial collapse. Even the "deluge of puffing" lavished upon it by the French press could not avert the inevitable, and M. de Lesseps himself withdraws, utterly disappointed. The decisive blow came when the Government refused to authorize the postponement of the payment of interest on 500,000,000 francs falling due 14th inst., the Chamber of Deputies declaring that it had no right to legislate on the subject. Neither would it sanction the proposal of the Minister of Finance to form a new company. Thus, according to present indications, 870,000 holders of canal shares, scattered through the length and breadth of France, are doomed to lose their entire investment. Surprise is everywhere expressed that a financial hiatus of such vast magnitude causes so little monetary disturbance. It is estimated that the French people have paid over \$250,000,000 in cash for shares and bonds amounting to \$400,000,000 at par. But the fact must be considered, as stated by the *Economiste Français*, that "there is nothing in this entirely localized failure analogous to the crash of 1882," the failure of the Union German Bank, "extending over a vast number of interests." Apart from this view, however, it may yet become apparent in the pending elections that the people, once aroused to a consciousness of their plight, may become peremptory in their demands for redress—demands which it may be difficult to evade. Thus, a vital question of international importance may be forced into view—namely, "Shall the Government of France assume obligations by which it virtually erects a protectorate on the highway of American commerce between the Atlantic and Pacific Oceans?" The United States Government, France is well aware, could not look with approval upon proceedings of this character. In its pecuniary aspects, as concerns American investors, the downfall of M. de Lesseps is of no serious moment, ex-Secretary Thompson, who undertook to push the enterprise in this country, having met with indifferent success. The American Dredging Company, after excavating 19 miles of canal, still want \$5,000,000 to complete their contract, but they have already handled \$12,000,000 of the promised total. The Lesseps canal fiasco is compara-

ble only to the "Great South Sea Bubble" which long ago passed into history. The Nicaragua Canal advocates will now take fresh courage.

OBITUARY.

PHILETUS W. GATES.

Philetus W. Gates, one of the pioneer iron manufacturers of Chicago, died in that city on the 1st inst. He was born February 25, 1817, at Fenner, Madison County, N. Y. His father was a carpenter by trade, served in the war of 1812 and was pensioned by the Government. At the age of 15 he went to Bristol Center, N. Y., to learn the blacksmith trade. At the end of two years he bought the business and conducted it for one year, but wishing to go West sold the shop and found himself in Buffalo, next in Cleveland, Ohio, Pittsburgh, St. Louis, and finally Chicago. Here he located in a place called Yankee Settlement, 25 miles southwest from Chicago. He worked at farming during the summers and spent the winters at his trade. In 1839 he married Miss Abigail E. Scoville, and in 1840, in connection with his father-in-law, Hiram H. Scoville, took a sub-contract of the Illinois and Michigan Canal. The failure of the State project and the depreciation of the value of the script which they received as pay left them \$700 in debt. In 1842, with \$3 and a horse, which was afterward sold for \$7, he and his father-in-law moved into Chicago. He purchased lumber on credit, erected a shanty near Randolph-street bridge, and began blacksmithing. At the end of a year a foundry and machine-shop were added. Four years later Mr. Gates purchased Mr. Scoville's interest for \$4000, and later took in as a partner A. H. Hoge. Two years after Mr. Hoge sold out to George S. Knight, and the firm became Gates & Knight. The business was successful, and had increased to such an extent that from 200 to 300 men were daily employed. Mr. Gates purchased the interest of Mr. Knight, and, associating himself with Andrew Fraser, G. S. Warner and Thomas Chalmers, the firm became known as P. W. Gates & Co. The business flourished until the financial panic of 1857, when an assignment for \$350,000 was made. Arrangements were made so that the business could be carried on, when the partners became dissatisfied and Mr. Gates assumed complete control. In a little over a year the assignment was set aside, and in 1860 Mr. Gates obtained a charter for the Eagle Works Mfg. Company, under which title the business was conducted until the great fire of 1871. He then retired from active business, and gave his attention to the improving of the property he had acquired. He was a thorough mechanic and the inventor of many improvements in manufacturing, among which may be mentioned the patent die for cutting screws. He was the first manufacturer in Chicago to institute a system of profit-sharing among his employees, and was active in works of benevolence. He left a large estate, and his three sons survive him.

D. A. STEWART.

D. A. Stewart, chairman of the firm of Carnegie Bros. & Co., and identified with many of the extensive manufacturing concerns of Pittsburgh, was found comatose in bed Friday morning and never regained consciousness. All the means known to surgical and medical science were employed to revive him, but he died at 9 o'clock. Mr. Stewart was born in Chambersburg, Pa., and was 57 years of age. He was the son of General Stewart, who was one of the officers of the Pennsylvania Railroad. It was Mr. Stewart's father who gave

Thomas A. Scott, his nephew, his first railroad appointment, and Mr. Scott never forgot it. Mr. Stewart married one of the daughters of the late John Scott, a bank president at Pittsburgh. In 1872 he engaged with his present partners in constructing the Edgar Thomson Steel Works, and at his death was chairman of the firm of Carnegie Bros. & Co., Limited, and one of the managing directors of Carnegie, Phipps & Co., Limited, and president of the Carnegie Natural Gas Company.

WM. R. DAVENPORT.

Wm. R. Davenport died 18th inst., at Erie, Pa. He went from Watkin's Glen, N. Y., to Erie when a boy. He commenced life as a railroad clerk, and next engaged in the manufacture of car-wheels. In 1871 he, with Judge Galbraith and John Fairbairn, established the Erie Car Works, and within a few years carried their operations into Michigan, where they manufactured pig iron and charcoal furnaces, and where they were the pioneers of the business in the Northwest.

Convict Labor in Texas.—I.

BY JOHN BIRKINBINE, PHILADELPHIA.

The State of Texas cares for its 3200 convicts in two penitentiaries, and in several farms covering some 2500 acres; the latter are devoted to raising by convict labor the corn, sugar, vegetables and fruit required for the sustenance of the State wards. The Penitentiary Board also owns some dairy cattle, about 500 mules (used for draft animals), maintains a flock of as many goats, and raises a large number of hogs. In short, with the exception of beef, flour, beans, dried fruits, condiments, &c., the State penitentiary farms furnish provender for the convicts, for the guards, and also for the live stock, and raise the cotton, which is woven by looms in the penitentiaries into the striped goods which constitute the convicts' garb. The two penitentiaries are located in the Eastern portion of the State, the one first established being at Huntsville, Walker County, 125 miles north of the Gulf of Mexico, and 110 miles west of the Louisiana boundary, the newer being at Rusk, Cherokee County, 75 miles northeast of Huntsville, 75 miles east of the Louisiana boundary, 175 miles north of Galveston, and 150 miles south of the Red River, forming the boundary between Texas and Indian Territory.

At the Rusk Penitentiary no females are received, but the Huntsville Penitentiary accommodates both sexes. The women are principally employed on the cotton farms, in manufacturing the sheeting and the cotton goods for summer wear; the cotton and woolen goods for winter wear of the convicts, as well as some kerseys for the market, which are woven on looms; and, in addition, female convicts are utilized in the manufacture and repair of the clothing, bedding, &c., required for the penitentiaries and camps. The industries carried on within the walls of the Huntsville Penitentiary also embrace a cabinet shop, where furniture is manufactured for prison use and for sale, a wagon works, a machine shop, foundry and boiler shop, producing engines and boilers for saw mills and cotton gins. The shoes for convicts are also made at Huntsville. Farms and railroad construction furnish employment for many convicts who are quartered in camps, and are seldom within the walls of the penitentiaries. Formerly Texas employed the contract system, but this was abandoned owing to the abuses which the cupidity of contractors, or the ignorance as to discipline

aided in bringing into the system. The better sentiment of the population rebelled against under-feeding, overwork, severe punishments, including stocks or thumb-screws, and as a consequence the State now controls the labor of all her convicts, and feeds, clothes, watches and cares for them.

It is not the present purpose to discuss the convict labor problem in the various parts of the State, but to treat it only as it relates to the iron industry established at the Rusk Penitentiary, or it may be more proper to say that the possibility of establishing an iron industry was the encouragement which caused the location of the penitentiary at Rusk. The project was, however, not carried out without the troubles which affect initial industries generally; in fact, it was only by abiding faith and persistent urging on the part of the superintendent and penitentiary board that the iron industry escaped abandonment on the eve of successful demonstration. The blast furnace was erected in 1883, and blown in early in 1884, but the campaign was unsatisfactory, chiefly because the contractors who had leased the convicts at a per diem rate were unacquainted with the production or manufacture of iron. This failure brought the enterprise, for which the penitentiary board had such hopes, into disrepute, and a committee of the Legislature recommended closing up the blast furnace. Upon urgent pleading on the part of the superintendent the Legislature made an appropriation for further trial, practically contingent on success, and late in 1885 a second blast was commenced, which terminated in a few months, owing to the stock on hand being exhausted. But the campaign was long enough to demonstrate that pig iron of good quality could be made at a price which permitted of its being marketed at a satisfactory profit. Consequently the appropriation became available, timber lands for a permanent supply of charcoal, as well as ore lands, were purchased, and Mr. R. A. Barrett was made superintendent of industries. Since this time the problem of iron production has been solved, a statement which is borne out by the product of the furnace and foundry. The blast furnace is now and has been producing over 1000 tons of charcoal pig iron per month, which has been sold to car-wheel, stove and other foundries in Texas and other States, and furnished to the foundries connected with the State penitentiaries. One Illinois stove company purchases 500 tons of this pig iron at a time. In fact, the success of the industry has been sufficient to encourage Northern capital to invest in adjacent ore and timber lands, and a charcoal blast furnace 11 x 60 feet is now under contract, and other industries are locating at New Birmingham, 3 miles from the Rusk Penitentiary.

The industrial plant connected with the Rusk Penitentiary consists of a blast furnace 55 feet high and 9 feet 6 inches diameter at bosh. The stack is an iron shell supported on columns. The casting-house and engine-house are of brick. There are two batteries of cylinder boilers, one iron pipe hot oven, a 60-inch by 4 feet Weimer blowing engine, Otis hoist, pumps, &c. Ample stockhouse room is also provided, and the plant is modern in construction. The blast furnace buildings and the pipe foundry, a building 100 x 140 feet, are not within the penitentiary walls, but are inclosed by a stockade which has guardhouses at intervals. Into this inclosure the ore is hauled from the mines 1 mile distant in wagons driven by convicts, the charcoal and limestone is shifted in, and the pig iron, cinder or iron pipe carried out on railway cars, the engine and train crew being convicts. All of the men employed around the blast furnace are convicts except a furnace-keeper on each turn, and the only free employee

connected with the pipe foundry is a negro foreman, whose ability as a manager is helping to solve the race problem in Texas. As the rules of the penitentiary restrict enforced labor to 60 hours per week, and the men employed at the blast furnace work in shifts of 12 hours each, they are credited with 5 cents per hour for overtime, so that a convict who works for seven days on shifts of 12 hours each receives a credit at the end of the week for \$1.20, which he can expend for candles, tobacco, paper, &c., in excess of the weekly allowance to each man, or which can remain until the expiration of his sentence, or it may be sent to his family.

The pipe foundry is equipped for making cast iron water and gas pipes from 4 to 12 inches in diameter, and several important contracts have been filled, the output to date being 2000 tons. A peculiar feature of the pipe foundry is the use of direct metal from the blast furnace. When the furnace is being run on foundry irons the main runner in the casting-house is continued into the foundry, and as much of the cast as is required is led into a 25-ton ladle. From this the metal is poured into distributing ladles, which are carried on the traveling crane to the pipe flasks. When the furnace is making car-wheel iron, or other than a satisfactory grade of foundry iron, pig iron is melted in the cupola. The pipe foundry is equipped with core ovens, drying ovens, proving press, traveling cranes in the foundry and in the yard, and other necessary appliances. All pipe are cast in vertical hinged flasks, those for the smaller sizes accommodating two pipes each. The buildings within the penitentiary walls, which are devoted to industries, comprise machine shop, pattern shop, foundry, smithery and wood-working shop, all operated with convicts, and under convict foremen, except the pattern and machine departments, which have the supervision of a skilled mechanic employed by the State. Some of the work turned out from the shops is worthy of mention. Over 800 tons of castings were made for the State Capitol building at Austin, among which were fluted columns 33 inches in diameter and 22 feet long, with capitals, the thickness of the metal in the shell being $\frac{1}{4}$ inch. All of the dome castings, some of them 4 feet 6 inches by 11 feet, and $\frac{1}{4}$ inch thick, cast on curves; the oriole windows, cornices, &c., were included in the contract, for which the State received the same price at which other foundries would do the work. The machine shop and smithery did considerable work on these castings, and have produced large numbers of tram cars for cane and wagons for sugar for use on plantations, besides fitting up the pipe foundry. All the wagons, carts, furniture, &c., required to carry on the work connected with the penitentiary are constructed by convicts within the walls.

The results accomplished cannot be other than satisfactory to Major Goree, who, as superintendent, has championed the iron industry in connection with the penitentiary, and the work already done is creditable, for, almost without exception, the convicts have learned whatever they knew of any of the trades since their confinement. Men have gone from the Rusk Penitentiary (and each year will add to the number) with a determination to start life anew, backed by a trade acquired under the State discipline. Men who entered here mainly because, having no settled aim in life, they drifted into channels which led them into difficulty, may re-enter the active world, free from the prison pallor due to the system of solitary confinement, and equipped with a knowledge of tools and how to use them. The conclusions which force themselves upon the writer, after three visits to the vicinity of the Rusk Penitentiary, cover-

ing a period of three years, when opportunities were given to critically examine the system employed in utilizing convict labor in Texas, are of such nature as to commend it to favorable consideration. The questions which naturally arise are:

1. Is the employment of convict labor prejudicial to free labor?

2. Does the State become a damaging competitor with private enterprise?

3. Is the system of punishment reformatory, and severe enough to encourage the reduction of the number or rather the proportion of criminals?

Before taking up these important queries it is proper that some data as to the disposition of convicts and their employment be given. The sentences imposed by Texas courts are as a rule severe, and of the 860 convicts who are connected with the Rusk Penitentiary 10 per cent. are sentenced for life, or what is equivalent to it, a term of 99 years; 15 per cent. have been given terms of 50 years or over; 15 per cent. have to serve imprisonments of between 15 and 50 years. It is proper to state that a majority of those sentenced to long terms are sent to Rusk Penitentiary, and that owing to a system of commutation for good conduct a convict sentenced for 10 years may complete his term in 7½ years, or one who is sentenced for 20 years may reduce his time to less than 13 years. Murder, horse theft and rape are the crimes which receive the heaviest sentences, but other crimes have meted out to them punishments which, when compared by length of terms of imprisonment with those given in other States, are severe, and in many cases so unjust as to cause the Legislative committee which investigated the prisons to recommend the establishment of a pardon board, or the exercise of executive clemency. The earlier history of Texas and the extent of its territory, much of which is still border lands, is undoubtedly responsible for some of the extreme measures, and the former existence of slavery has left its impress in the harsh punishment of negroes. Another reason for many severe or apparently unjust sentences is that the law of Texas permits the jury not only to determine the guilt of the prisoner but to fix the penalty, the province of the judges being to see that a fair trial is held, that the law is expounded, and to pronounce the sentences imposed by the jury. Under such a system ignorance, prejudice and prevailing public sentiment will in any community influence the decision of juries, and the committee above referred to recommended "that a pardoning board, or committee, be inaugurated for the purpose of visiting the penitentiaries, examining into doubtful cases, looking into the prison records of the same, and into the conduct of life of the long-term convicts, and to make report thereon to the Governor for his action in extending executive clemency on the recommendation of such pardoning board or committee."

The convicts are divided into three classes—viz., those whose sentences do not exceed 15 years, those whose sentences are between 15 and 50 years and those whose sentences exceed 50 years, the last two being easily recognized by red or black balls stenciled on the striped suits in addition to the name and number. As a rule, the long-term men are employed within the walls and make the best mechanics, as their only hope of commutation or pardon—beyond the time earned—lies in making themselves notable by their conduct or work. In preparing the patterns for the State Capitol contract over one-half of the force engaged in the pattern shop had been sentenced to the penitentiary for murder. Another division is the "trusties" and the "rank men." The "trusties" are accorded special privileges, due in part to their conduct, and in part to the length of sentence and other circumstan-

ces which would have a tendency to discourage attempts to escape. Only occasionally is a long-term convict made a "trusty," a majority of them being men who have nearly completed their imprisonment, or whose home ties would prevent assuming risks of recapture in the State. The "trusties" are employed as clerks, draftsmen, messengers or turnkeys; they compose the crews of the trains running on the tracks about the blast furnace, and to the main line of railroad—one mile—or on the branch road to the clearing where charcoal is made, and often are sent 15 miles away with their trains with no guard. The "trusties" also act as stablemen, herd goats, work in the garden or peach orchard, &c. When the writer first visited the Rusk Penitentiary in 1885, he was met at the railroad, 17 miles distant, by a "trusty" who was sent with a carriage to convey him to Rusk. It is seldom that a "trusty" becomes a fugitive.

The second class, or "rank men," embrace all convicts who are not "trusties," some who are considered safe and not desperate are used as teamsters or work in the fields, where a guard may have as many as twelve to watch. The balance are either worked within the penitentiary wall or within the furnace stockade. At the coaling camp, 16 miles from the furnace, where the charcoal is made, there are 225 men, of whom 40 are "trusties," who are utilized on the night watch, looking after the meilers, or detailed as leaf haulers and to other positions where guarding would be impracticable. All the charcoal used at the blast furnace is made in meilers in the woods, there being no kilns connected with the furnace plant.

In mining ore, chopping wood, making charcoal and general work on farms or outside of walls and stockade the rule is to allot one armed guard to six "rank men." In addition, where there are a number of convicts together, a mounted guard, equipped with a breech-loading shotgun and a revolver, is provided. He also has several deer hounds and a catch dog to capture any who attempt to escape. The presence of armed guards is an unpleasant, but evidently necessary, feature, but is evidently better than the ball and chain. The only use of the latter is as a punishment, but when a number of convicts are taken to any distance they are chained together and accompanied by guards. In the camp wooden prison buildings, with bunks, are provided, but the convicts are not chained in the bunks, as was the former practice. At the blast furnace most of the day force are long or life term men, but at night they are chiefly men whose terms expire within two years. As the inclosure within the stockade, as well as the penitentiary proper, is brilliantly illuminated by electric lights, the force of guards at the blast furnace is no greater at night than during the day. The iron ore, which is abundant in the vicinity of the Rusk Penitentiary, is a brown hematite, formed either as a bog ore or as the result of the oxidation of a carbonate. It lies in practically continuous horizontal beds, averaging probably 30 inches in thickness, over large areas, covered by a thin ferruginous rock and sand. The ore is, therefore, easily won, and the spectacle of over 100 convicts, in striped suits and hats, shoveling away the sand, prying up the ore or loading it on wagons is interesting. A squad of guards surround the workings and a guard accompanies a train of six teams hauling ore to the furnace.

Schools of Forestry are earnestly advocated by Prof. E. L. James, of the University of Pennsylvania. "At least 20 per cent. of the whole agricultural region of any country," says Professor James, "should remain in forest for the good of

the other 80 per cent. Few people are aware of the peculiar relations the forests bear to our national prosperity. How many know that the value of the forest products of the United States amounts to more than \$700,000,000 annually? But the increment of wealth which that yield represents is not the most important consequence of the growth of forests, and the argument that they should be preserved and fostered and protected for fear that a scarcity of timber will follow is not the only one to be presented in behalf of their sustenance. A more important one is that they determine to a great extent climatic and hygienic conditions. Whether the presence of forests increases the rainfall in a given area is a disputed question, but that they bring about a much better distribution of moisture through the year is not doubted."

The Western Cut Nail Manufacturers' Association.

In our issue of last week we made brief mention of the fact that the Western cut nail manufacturers had formed another organization, to be known as the Western Cut Nail Association. For some weeks past the manufacturers have been endeavoring to form a pool, or devise other means to remedy the present demoralized condition of the cut nail market. Several meetings were held at which the pooling scheme was thoroughly discussed, but it was discovered that there were numerous obstacles in the way of success, the principal one being the refusal of one or two large concerns in the West to be governed by the pooling plan in any way. On Tuesday, the 11th inst., a large meeting of the manufacturers was held at the office of the Benwood Iron Works, at Wheeling, W. Va. The following named firms were represented:

Benwood Iron Works, Wheeling.
Riverside Iron Works, Wheeling.
Belmont Nail Company, Wheeling.
Wheeling Iron and Nail Company, Wheeling.
La Belle Iron Works, Wheeling.
Junction Iron Company, Wheeling.
Bellaire Nail Works, Bellaire, Ohio.
Laughlin Nail Company, Wheeling.
Jefferson Iron Works, Steubenville, Ohio.
Kelly Nail and Iron Company, Ironton, Ohio.
Belfont Iron Works Company, Ironton, Ohio.
Wellston Steel and Nail Mill Company, Wellston, Ohio.
Middleport Steel and Nail Works, Middleport, Ohio.

In addition to those concerns represented letters were received from several other firms promising their co-operation. After a long discussion on the question of forming a nail pool it was decided to abandon that scheme, and in its place the Western Cut Nail Manufacturers' Association were formed. Mr. J. N. Vance, of the Riverside Iron Works, Wheeling, was elected president, and Edward Hazlett was chosen supervisor. The headquarters of the association will be in Wheeling, at which point Mr. Hazlett will have an office for the management of affairs pertaining to the association. The card rate was fixed at \$1.90, with 10 cents per keg off for carload orders, and the usual discount of 2 per cent. for cash. It is not the intention of the association to restrict the output or control the sales of members. On the contrary, it will be the aim of the association to operate on an equitable basis, and to make it possible for them to run more steadily than heretofore. All contracts for nails for future delivery will be held as other contracts are, and enforced strictly, and a determined effort is to be made to place the nail trade on a more business like basis.

Indiana Natural Gas District.—I.

The natural gas district of Indiana lies northeast of Indianapolis, that city being less than ten miles from the gas-bearing territory. The extent of this district is, roughly, about 60 miles in length and 40 miles in width, comprising the largest single gas district thus far discovered in this country. The territory embraced in these limits has been very thoroughly developed since the existence of natural gas was discovered there about two years past, and the supply has been demonstrated to be large and of satisfactory flow, insuring its continuance for many years. The wells which have been sunk average a little over 900 feet in depth, and thus far there has been no perceptible diminution of pressure at any of them caused by the sinking of other wells in their vicinity. Salt water is forced up with the gas in the wells in part of the district, but not in sufficient quantity to interfere with the use of the gas, being easily disposed of. Its presence in those localities has, however, caused some manufacturers to prefer other points in the district in which dry gas is found. This is apparently an advantage to the district, as it has led to the establishment of several manufacturing centers, instead of the concentration of activity at but one or two points. The Indiana natural gas is of high calorific power, and besides it possesses a decided odor, causing any leak in the pipes to be immediately detected and easily located. The whole of this district is well populated, and it lies in a part of the State supplied with a perfect network of railroads, thus affording ready-made transportation facilities, and an abundance of labor, both of which are highly appreciated by the manufacturers who are removing thither to enjoy the supreme benefit of cheap fuel. The country has further been endowed by nature with a rich soil, so that its agricultural resources are adequate to the support of a teeming population, which is an advantage by no means to be overlooked.

Four towns in this district have sprung into prominence, and are competing with one another for manufacturing supremacy. They are Kokomo, Marion, Anderson and Muncie. Each is a county seat, and each offers inducements to outside manufacturers for the location of works in its immediate vicinity. Each is likewise a railroad center, none of them being dependent on but one line. The interested visitor will find them apparently equally enterprising, all of them having systems of water works, and being lit with electric lights as well as artificial and natural gas. The population of each place has likewise doubled within the past two years, the number of inhabitants now ranging from 8000 to 12,000. They are all supplied with good newspapers, and other evidences of thrift and enterprise abound on every hand. Real-estate speculation has, of course, been rife, but sensational booming has been discouraged, the residents of each locality wisely preferring a steady growth on a solid basis to a rapid advance in values and the inevitable harmful reaction which would follow. This is evidenced by the scarcity of dwelling houses at present experienced throughout the district, the utmost endeavors of the builders being unable to keep up with the demand. Among the industries which have been transplanted to this new field of activity the manufacture of glass is most prominent, but iron and steel workers are fully alive to its advantages, and several important establishments have already been built up in these lines, while others are making preparations to follow. As far as possible the industries of the district have been diversified to avoid the calam-

itous effects upon the community of depression in trade or of strikes or labor troubles in any one branch. Passing from the general features of the district to the special points of interest in the leading towns, the industrial establishments first considered will be those of

KOKOMO.

The Rockford Bit Company have located their works some distance from the built-up portion of the town, and not only enjoy a pleasant site but have ample room for enlarging. The works of this company were formerly at Rockford, Ill., and at Ashtabula, Ohio. These two plants were consolidated this year and their machinery was removed to Kokomo, where it was first started up in September. The buildings are substantially constructed of brick, the factory occupying a large building and the office and shipping department occupying a second. The forge room, 80 x 86 feet, is situated in one end of the main building. It is one story high, is well lighted, and contains four helve hammers and special machinery for shaping and pointing bits. The fitting up and machine room takes up the remainder of the first floor, its dimensions being 100 x 86 feet. It is equipped with lathes, drills, emery wheels, and a number of special machines for shaping bits. Many of the machines in use have been built by the company. This part of the building is two stories high, the second story being devoted to the polishers and finishers. Power is supplied by a Mansfield Machine Company's engine, built at Mansfield, Ohio. Natural gas is used for raising steam, for heating steel in the forge room, for heating the works and offices and for light. In comparison with coal the use of gas in the forge room is highly appreciated by the workmen, who lose no time waiting for the fire to burn up, and also lose no steel through overheating. In point of economy there is no comparison, as the gas is furnished to the company free for all time. From 50 to 60 hands are now employed, most of whom are skilled mechanics, and they turn out about 2000 bits daily. American steel is used, which is made of special quality to meet the exacting requirements of this class of tools. A great variety of wood-boring tools is manufactured, special attention being given to bits for car-builders and railroad mechanics. The standard tools made embrace molding cutters, carving cutters, dovetailing cutters, &c., hollow augers, furniture-makers' bits, sash and door makers' supplies, &c., but orders are also taken for special and irregular sizes and shapes, which cannot be purchased from the usual stock carried by dealers. The company issue a catalogue illustrating and describing a large number of the tools they manufacture. Their Perfection and Juvenile Perfection bits are put up in sets in finely finished wooden boxes. A considerable portion of the catalogue is devoted to cuts of patterns of solid steel-edge molding cutters, the manufacture of which has recently been added to the company's line.

The Rock Island Knife and Shear Company's works are in the same locality. They were removed to Kokomo from Rock Island, Ill., and have very recently been put in operation. Their first pair of shears was turned out on the 3d inst. The factory is built of brick, 75 x 24 feet, two stories high, with a one-story wing, 30 x 20 feet. Natural gas is here used for every purpose requiring fuel except welding. Steel-laid shears and tinnern's shears and snips are at present the sole product. A drop forge is used for welding the steel edges to the blades. Three different kinds of shears are made—namely, full nickel, japanned bows and polished blades, and japanned bows and nickel-plated blades. Sixty sizes and styles are turned out altogether. The plant of the company

comprises a drop forge, tapping and drilling machines, emery belts for polishing, buffing wheels, grindstones, japanning oven and a nickel-plating machine. The company maintain a Western office at Rock Island, Ill., and an agency at Kansas City, Mo., to handle all business arising west of the Mississippi. D. F. McLarty is president; W. B. Ferguson is vice-president; W. M. Prentice is secretary, and J. F. Robinson is treasurer.

The glass interests of Kokomo comprise the Kokomo Window Glass Company, who operate ten pots, and whose works were transplanted from Ithaca, N. Y.; the Howard Glass Works, making a specialty of fruit jars, operating ten pots, and who came from Steubenville, Ohio; the Opalescent Glass Works, C. Edward Henry, proprietor, removed from New Rochelle, N. Y., and manufacturing colored glass for decorative purposes, electric insulators, &c., and, last, the Diamond Plate Glass Company, a new corporation, whose works are now in course of erection, and whose buildings alone cover 8½ acres. This company have a capital of \$600,000, and expect to employ 500 workmen. They intend to begin manufacturing operations in April, their machinery being now in course of installation. The members of the company are local and Ohio capitalists. Monroe Seiberling, of Kokomo, is general manager. M. P. Elliott, superintendent, was last connected with the plate glass works at Crystal City, Mo., and has had experience in the management of plate glass works abroad. The Ohio capitalists embrace A. L. Conger, O. C. Barber and George Perkins, of Akron.

The miscellaneous manufacturing establishments embrace the Kokomo Wood Pulp Company, making paper stock; the Kokomo Straw Board Company and the Newman Paper Company, making paper boards; a canning factory, for fruit and vegetables, working 400 hands in the season; the Enterprise Heading Company, making barrel heads and staves; Lynch Brothers' boiler works, removed from Titusville, Pa., and Ford & Co.'s job foundry, also from Titusville. These establishments have all been located in Kokomo since the discovery of natural gas, mainly through the efforts of the Board of Trade, which is an association of the citizens organized for the purpose of advancing local interests. The Board of Trade control a number of gas wells, from which they furnish free gas to the manufacturers. They are in communication with a number of other manufacturers in various sections of the country, with a view to removing their works, and have excellent prospects of success with a large part of them. The railroads passing through Kokomo are the Chicago, St. Louis and Pittsburgh, the Lake Erie and Western and the Toledo, St. Louis and Kansas City.

MARION.

At this place 20 manufacturing establishments are now in operation and three are in course of erection, whose choice of the locality is due to the supply of natural gas. The first factory under the new dispensation started to lay its foundations in July, 1887. There are three window-glass works, one glass-bottle factory, one fruit-jar factory, one wood-pulp works, one for making straw wrapping paper, one school crayons, a skewer works, turning out 1,500,000 skewers daily; a branch factory of the wagon works of the Studebaker Mfg. Company, of South Bend, a clock factory, hame works, shovel handle factory, soap works, excelsior factory, chair and wooden hoop factory, sleigh-bell factory, stove works, malleable iron works, &c. The population of this place was but 4200 only two years since, and it is now estimated at over 10,000.

The Marion Stove Company have a very complete foundry for the manufacture of hollow-ware and stoves. The establishment was formerly located at Sidney, Ohio, and operated under the name of Sidney Mfg. Company. The owners are F. J. Gould, F. P. Fruchey and R. O. Bingham. Their works at Marion were put in operation in March. The buildings are of brick. The molding floor is 100 x 60 feet, located in a one-story wing, and has a cupola of 48 inches outside diameter. The rattling and cleaning room adjoining is 60 x 40 feet, and contains five rattlers or tumbling barrels, to which five more are soon to be added. The engine room, which is by the side of the rattling room, is 30 feet by 24 feet, and is furnished with a Russell engine built at Massillon, Ohio. The finishing is done in a two-story building, 80 x 30 feet, containing drilling, grinding and polishing machinery. Part of this building is also used for storage. A plant for nickel plating will be added to the finishing department early in the coming year. The principal stoves made by this company are the Sidney Oak and the Retort. The latter is a stove specially adapted for burning soft coal. The hollow-ware line is very complete, covering all kinds of stove hollow-ware, sugar kettles, ham boilers, furnace kettles, hollow mauls, &c. They also manufacture cellar grates, ventilator grates, bob sleds, sled soles, porch supports, sled runners, bridge castings and cast washers.

The Barton Bell Company, of Marion, Ind., manufacture all classes of small Bells, their line embracing Sleigh Bells, Call Bells, Car Bells, House Bells, Gongs for electric purposes, &c. The factory was originally located at East Hampton, Conn., having been established there by the Barton family in 1793. It was removed to Marion and put in operation in its new location this year. As the company's leading customers were in the West and the raw materials of their manufacture were principally obtained in the West also, it was concluded, in the interest of economy, that it would be desirable to remove the factory to that part of the country, and the natural gas field of Indiana, in which Marion is located, offered the strongest inducements. A brick building was erected especially adapted to the purposes of the company. In form it is L-shaped, the arm containing the brass foundry being one story in height, 65 x 40 feet, and the main portion of the structure consisting of two stories, 110 feet in length by 40 feet in width. A few small buildings are connected with the works, and used for the storage of materials, &c. Natural gas is used wherever heat is required, and a 30-horsepower engine furnishes the power. From 35 to 40 hands are now employed, and all the processes in the manufacture of bells, from the casting to finishing and mounting, are carried on in this one establishment. In casting sleigh bells in these works the "jingler" is placed in a core of sand, which is afterward properly inclosed with others in a flask into which the melted metal is poured. When the rough castings are taken out of the flask the sand in the core is easily reduced to small fragments which run out through the holes in the bell, leaving the jingler ready to perform its function of making sleighing music. The original method of making sleigh bells was to cast them in two pieces and braze or solder them together. The present method was invented by the grandfather of A. W. Barton, present secretary of the company and manager of the works. The company publish two catalogues or price lists, one being devoted to their general line and the other to gongs and bells for electric and other purposes. They have brought out a number of novelties this season in saddle and shaft

chimes, with a view to meeting the demand for fine musical effects and artistic ornamentation.

Sweet & Clark, formerly of Troy, N. Y., are putting up a large malleable iron works. The buildings are being constructed of brick. The foundry is 254 feet long by 74 feet wide, the annealing room is 188 feet long by 64 feet wide, and a building for the manufacture of curry combs is 200 feet long by 70 wide, two stories high. Eight annealing furnaces will be erected at first, room being left for additional ones when needed. The specialty of the works will be the manufacture of curry combs, but the firm will be prepared to contract for all classes of malleable casting work.

Dougherty & Feely, manufacturers of boilers and stationary engines, at Chester, Pa., have completed negotiations for the removal of their works to Marion. They will erect a building 300 feet long by 85 feet wide, and expect to employ 250 men when their works are in full operation.

Negotiations are pending with other manufacturers to induce them to locate at Marion. Free building sites and free gas are offered. Marion has recently been selected as a very suitable location for the erection by the National Government of a soldiers' home, and a large appropriation is available for that purpose. It will thus be seen that there is good reason for the belief of the citizens that their town is destined to be the seat of a very large population. The railroad facilities are excellent, the lines running through the town consisting of the Chicago, St. Louis and Pittsburgh, the Toledo, St. Louis and Kansas City, and the Cincinnati, Wabash and Michigan. A belt railroad has been constructed by private enterprise, which passes through the principal manufacturing locality, and affords direct connections with all the roads.

The Coke Trade.

For the first time in several months the supply of coke at the present time is greater than the demand. This is accounted for by the fact that the recent heavy demand for coke has had the effect of lighting up the idle ovens in the Connellsville region, thus greatly increasing the supply until it has overcome the demand, and a slight reaction in the market has taken place. A number of blast furnaces are reported to be overstocked, and there seems to be no question but that the new year will not witness the activity in the coke market that existed a month or so ago. In view of this, it is doubtful if the proposed advance of 25 cents per ton, which was to go into effect on January 1 next, will take place. The protest recently entered against this proposed advance by the Western Coke Consumers' Association, mention of which has already been made, has also had considerable influence with the operators, and it is probable that there will be no change in prices for some time yet. The production for the month of November aggregate 532,400 tons, as against 523,700 tons for the month of October. The total shipments for November also exceeded all previous records, averaging 1118 cars per day. The record of the past six months is set forth in the following table:

1888.	Pittsburgh.	West.	East.	Total.
June.....	4,900	9,460	4,800	19,160
July.....	4,000	10,700	5,860	20,560
August.....	5,350	12,450	6,650	24,450
September.....	5,270	13,916	6,140	25,326
October.....	5,900	17,900	5,925	29,725
November.....	6,325	17,085	6,060	30,070

The estimated production for the week ending December 8 was 126,895 tons, or about 7050 cars, which is the largest pro-

duction of any week this year, and perhaps the largest in the history of the region. The shipments during the same week aggregated 6950 cars, consigned as follows: To Pittsburgh and rivers, 1500 cars; to points West of Pittsburgh, 4000; to points East of Connellsville, 1450. At 18 tons per car, 6950 cars moved represent 125,100 tons, 1800 tons, or 100 cars, less than the aggregate product of the region.

HARDWARE ENGINEERING

BY OBERLIN SMITH.

In these days, when almost every structure, from a human brain up to (or down to) a suspension bridge, is regarded as a machine, the profession of mechanical engineering has become a very dignified and important one, both when practiced by those who rear and train human brains as well as by those who design and build suspension bridges. As a logical conclusion from these premises we infer that any intermediate structure which may be regarded as wholly or partially a machine requires the application of special knowledge in particular, and common sense in general.

Taking a view of the large class of familiar articles usually known as "hardware," we find that many of them may be properly regarded as machines, while to all of them may be applied many of the general principles which machinery designers must carry into effect. If such a designer desires a fit of the blues and an utter sinking of all heart that is in him down through the soles of his shoes, he has only to look over a collection of modern hardware, as shown in the shops of any of our large ironmongers. It is true in such a collection there are very many useful and convenient articles which our modern civilization could not possibly do without. Some of them are well designed for strength as well as beauty; but, sad to say, a considerable majority lack not only the proper proportions to get the greatest strength from the least metal (which fact of itself often makes them hideous) but almost all of them have not sufficient metal to make them more than temporary toys.

This is, of course, in many cases the result of sharp competition between manufacturers, especially in the case of staple articles which the different producers make nearly alike and which are not patent-protected monopolies made by only one concern. There is, however, no reason or common sense in bringing the weight of an article down to such a minimum that it becomes almost, if not quite, worthless. The remedy for this state of things may, in some golden future day, lie in a Governmental interference which shall prevent villainously weak and imperfect articles being sold in the shape of hardware, just as much as it ought to, and sometimes does, prevent poisonous, injurious and adulterated articles of food from being imposed upon a too credulous public. Meanwhile the remedy must lie with the individual manufacturer who values his reputation too highly to spoil his goods for the sake of the slight saving effected by robbing them of a few ounces of iron. The increased sales which would eventually come from embodying proper strength and correct mechanical principles in the design of this class of goods would far more than compensate any manufacturer who should thus choose to apply common sense to his business for his extra pig iron bills.

To begin such a reform, the proper measure to be employed by a manufacturer who does enough business to warrant such a proceeding is to employ an educated engineer, preferably one who has

been accustomed to planning machinery and who also has a reputation for artistic talent, to design each article just as he would the members of a machine. Such designing would consider the amount and direction of all probable future stresses, and would not ignore the ordinary principles governing the dimensions of shafts and pitmans and levers and beams. Just as Dame Nature shapes the trunk and branches of a tree with the beauty that comes of itself when maximum strength accompanies minimum material, so would be fashioned the main outlines of our ideal pieces of hardware. Just as she afterward adds the leaves and flowers, subsidiary to the main design of the tree, so would all mere ornament, such as diaper-work, conventional foliage, &c., be designed last; with the feeling that it was upon and with, but not of, the generic form dictated for each piece of metal by natural law.

Not only is reform needed in the strength and beautiful proportions of much of our hardware, but much more common sense is wanted in adapting it to all its functions, instead of only a part of them. The writer has been led to the foregoing reflections by the disappointing experiences due to moving into a new house, with its usual consequent of several months' attempted conquest over the "totally depraved inanimate things" in the shape of hinges, knobs, catches, window fasteners, sash weights, wall-hooks, and the thousand and one other things that are hung on to, and jammed in to, and screwed fast to, the woodwork of modern houses, even when the hardware has been paid for as of superior, or at any rate average, quality. During such contests as these the heart in its bitterness crieth out: Why should hinges be made just thin enough to bend a little with the weight of the door that is hung on them so that it aggravatedly rubs against the opposite jamb? Why should the screw holes in them allow only for so slim a screw that it draws out if the wood happens to be white pine, and just at the time, too, when a small boy wants to have a ride on top of the door? Why should the screws fastening door knobs to their spindles constantly work out of place, so that their sharp edges gash the confiding fingers that grasp them? Why are sash-weights sold with such sharp corners, and ornamented with ragged edges and fringe-like fins, so that they jam in their boxes, instead of being made with nicely rounded corners? Why are the most ingenious sash fasteners, although provided with levers and cams and wedges, and other anti-rattling devices, made so that, if the upper sash is slightly down from its upper position, or the lower one slightly up, the two members of the fasteners fail to engage, although the faithful housemaid thinks she has fastened the window and confidently goes to her peaceful dreams into which do not enter thoughts of the gruesome burglar whom she has so sorely tempted to "go a burgling?" Why do highly ornamented shutter-hooks crumble up and fall down like pieces of dry toast when a sash is left open and a 7-mile-an-hour breeze strikes the inside shutters? Why do wall hooks descend from their proper sphere in life and lie crushed and mangled upon the floor, should an overcoat be hung upon them in whose pocket has been left a shot pouch or a few extra hard apples? Why are the screws by which such hooks are fastened so slim and small that they ignominiously retire from the position they have taken in the wood, even in cases where the hooks themselves have had enough of the ordinary principles of the projecting beam applied to their design so that they do not break in twain?

I have, in the new house spoken of, been especially aggravated by the behavior of what, save for a slight structural

weakness, would have been one of the best inventions, in a small way, of modern times. This was an outside-shutter hinge with an attachment for operating the shutters from inside the room and holding them in any position desired, all by means of a beautifully nickel-plated crank projecting from each side of the inside casing. It was the best of such devices that could be found in the market, and was in general designed upon correct principles. Its action while in proper health and spirits was simply perfect, and all who have seen it have declared it to be one of the most convenient things among all the conveniences of the modern household. These machines (they properly belong under this head as a strictly engineering design) in spite of their many good qualities have been a source of some unhappiness to their user, simply because their maker, although he had a good thing, which was so far above ordinary cheap hinges that he need not attempt to compete with them, made them so light that they would break entirely off and the shutters fall to the ground if they happened to be left open with a high wind blowing. Was this to save from 2 to 3 cents' worth of iron per window? It seems hardly probable. Presumably the reason, as indicated at the beginning of this article, lay in the want of a carefully studied design. This should consist not only in calculating the strength necessary to resist the maximum stresses to be incurred, but in a practical trial of the embodied design afterward, and by tests which would secure a sufficiently high safety factor to avoid breakage in ordinary use, with its train of annoyances and a possible loss of reputation to the maker. In this particular case I had such an affection for the maker (though personally unknown to me) that I did him the favor to write him a good scolding, accompanied with some practical hints for improvement. These, I believe, he has laid to heart, let us hope with a probable result of an increase in the sum of human happiness among all those who do not like to put their heads and arms into a cold winter's night or take out a musquito frame and let in a lot of June bugs every time a pair of shutters have to be adjusted.

The above criticisms have not been written with unkindly feeling toward the men who are constantly providing us with conveniences to make more happy in little things our daily lot, but only with a view of calling their attention to some of the defects which their customers must suffer from, and with the hope that they will be spurred onward to renewed zeal in improving their wares. Very much good work has been done in this way in recent years in some of the articles now sold. In all our stores we see marvels of cheapness and efficiency. Among these are many of the carpenters' tools now in use. In fact, tools of all kinds seem to have been developed into better designs than has household hardware. Among the latter, however, are many beautiful articles, especially in the line of bronzework and iron in imitation of bronze. In many kinds of wirework almost absolute perfection has been reached. For instance, what could be more cheap and convenient and well adapted to its purpose than the screw eyes and hooks which can now be found in innumerable sizes and proportions? This same favorable criticism will apply to much of the hardware and to culinary utensils that are cut, stamped and drawn from brass, tin plate and other sheet metals. In the department of stoves and in steam and gas fitting there is much excellent work. In gas fixtures proper, however, although there may be much that is artistic, there is often some very poor engineering as regards the attainment of strength and durability. To look upon the dark side of the picture again, we

have only to enter the domains of the plumber. If there is in existence anything less worthy of the noble name of "machine" than some of the so-called water-closets and the mass of "contraptions" often placed on, in and about the tanks supplying them, this writer would like to know it. And then, the shapes—but let us draw the veil.

If this were a treatise on "The general cussedness of familiar things," instead of a sober article on hardware, I might mention jewelry. Did anybody ever know a breastpin whose pin would maintain its alleged elasticity? or a cuff-button strong enough to stay adapted to its environment?

Another breed of first cousins to the hardware family are the metallic toys which are now so numerous. Some of them are cheap and good; others cheap and nasty. So bad are some of the so-called "mechanical toys" that their makers run a grave risk in putting on them any name by which their origin might become known to the Society for the Prevention of Cruelty to Children; and yet they might, with, in most cases, scarce a fraction of extra cost, be made comparatively strong and durable. A good designer would often contrive such simplification of parts and such cheaper processes of construction as would more than compensate for a little extra metal, while at the same time he would secure stiffer and stronger members and more durable wearing surfaces. He would also avoid the few stupidly weak spots (caused by too small screws, rivets, &c.) which we often find in otherwise strong toys.

I saw a play once in which all the characters were ephemerals who, with but little lease of time, were born, and grew and died. In dealing with some of our modern cast-iron hardware this myth of my youthful recollection is forcibly brought to mind. Let us hope that, with advancing civilization, the makers thereof will learn to instill into their wares the power of more vigorous life and length of days, and not leave themselves open to suspicion of being like the shoemaker who passed his knife around the stitches after he made a strong seam, so that more new shoes would be wanted quicker. Perhaps the only present remedy available is for a long suffering public to "cry aloud and spare not"—not only in regard to corruption in politics or bad stitching in a \$10 pair of shoes, but also when they get a bad penny's worth of cast iron where they should have had a good penny-and-a-half's worth.

The process which is being worked experimentally at Springfield, Ohio, by Mr. Bookwalter, is the Robert process first developed at Stennay, France, and since, it is said, adopted at Angleur, Belgium. As we understand it, the principal patent of the process is that the metal in a small converter is blown on the surface, the tuyeres being so placed that the cinder formed is projected against the side of the converter, to which it adheres. Fresh surfaces of metal are thus constantly presented to the refining action, the process, indeed, being apparently a compromise between the refinery and the converter.

Bids were opened at the Ordnance Bureau, in Washington, on Saturday, for 27 cast-iron bodies for 12-inch mortars, for finishing and assembling the same and for 27 sets of steel forgings for trunnion hoops and breech mechanism for the same. The bids were as follows: R. Wetherill & Co., of Chester, Pa., for finishing, \$8500, or for manufacture complete, \$20,500; South Boston Iron Works, for bodies, \$2750; for finishing, \$4250; West Point Foundry Company made exactly the same bid; Builders' Iron Foundry, Providence, R. I.,

for bodies, \$1475; Radial Drill Company, of Cincinnati, for bodies, \$2850; Bethlehem Iron Company, of Bethlehem, Pa., for steel mortar forgings, \$5496 per set; Midvale Steel Company, of Philadelphia, for steel mortar forgings, \$2770 per set.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., December 18, 1888.

The tariff discussion in the Senate is not progressing as rapidly as Senator Allison, in charge, has wished, but he still insists that he will be able to bring the measure to a vote within two or three weeks after the holidays, if not sooner. The policy on the appropriation bills seems to be a re-enactment of the existing provisions for the expenses of the Government where practicable. The new year estimates and the existing appropriations are being carefully examined and compared, and where not absolutely necessary to add new items the bills for the next year are being kept within the bounds of the present. This course will save debate and will greatly shorten the time required for the parliamentary routine of getting these measures through the two Houses of Congress.

An arrangement of this character will give the Committee on Finance reasonable time for the disposition of the Tariff bill.

The tariff reform tendencies of certain Republican Senators do not please the sub-committee in charge. They say that they do not like spread eagle speeches one way and voting the other. The speeches, they say, influence public sentiment into the belief that the Republicans are divided on the general principles involved, which the voting does not sustain. The discussion in the Senate is now in Committee of the Whole. When the passage of the bill is reached the Republicans will be united on the committee's bill and the committee's amendments.

The Senate Finance Committee are still giving hearings, although the bill and amendments have been practically accepted in caucus. The value of the hearings just now is to strengthen the committee on certain points, which were not fully understood as to detail before the bill was reported. The Senate bill is not expected to receive even a vote in the House, as the Committee on Ways and Means have announced their opposition to it and their adherence to their own measure. It is apparent that the Democrats do not give up the tariff contest, nor do they intend to. It is evident that the next struggle will be the most stubborn one ever experienced in the tariff history, with the outcome in grave doubt. The educational campaign has commenced, and with industrial States like New Jersey voting as she did, it is fair to assume that there will still be two sides to tariff reform in the political struggles of the future.

PROPOSED NEW PORTUGUESE TARIFF.

The Department of State has received a translation of an official paper issued by the Portuguese Premier, which says: "The treaty of commerce and navigation celebrated with France terminating in 1892, it becomes necessary to gather the elements for the organization of a new project for a general custom house tariff that may hereafter serve as a basis for such negotiations as may be established with foreign nations. His Majesty the King sees fit to direct the Superior Council of the Custom House to make the necessary examination and studies to organize the said project of tariff. For this purpose the same council will apply to all corporations and authorities who may possibly be able to throw light on the subject."

TRADE REPORT.

Philadelphia.

Office of The Iron Age, 220 South Fourth St.,
PHILADELPHIA, Pa., December 18, 1888.

Pig Iron.—The outlook is still somewhat uncertain, but, in the meanwhile, prices seem to be held with a fair degree of steadiness—indeed, the strength of the market is remarkable, considering the enormous furnace output and the comparative indifference of buyers. It would not be quite correct to say that the market is as firm as ever; neither would it be correct to say that it is very much weaker, and yet, as regards some particular Irons, both statements would be correct. After careful investigation, it appears that nearly all leading brands are well sold ahead, and that only in very exceptional cases would concessions be made on further transactions. If the pressure from other quarters becomes very severe, competition will be met, but, in the present condition of order books, there is no immediate necessity for such a course, hence all the leading makes of Iron may be called steady to firm, at prices ruling for several weeks past. As regards other brands, however, there is undoubtedly both irregularity and weakness. In this group may be included almost every brand that is not regularly on the market. They may be from entirely new furnaces or from furnaces that are only on this market occasionally, or from local furnaces that are operated spasmodically. Irons of this character may be of good quality, but they have no regular standing, and are, therefore, hard to sell, even when offered at low prices, but it is this class of Iron that will probably make the market during the next six months. Notwithstanding the disadvantages, as mentioned, their ultimate disposition is, after all, only a question of price. A consumer might not be willing to experiment for the sake of 50¢ per ton, a dollar would make him consider the matter, and another half dollar would probably decide him to give it a trial anyway. The question is just this: Is there enough outside Iron to lead to results of this character? It is too soon to give a definite answer to that question, but the position, to say the least, is very sensitive, and not altogether conducive to confidence. A few large purchases would be a great relief to the market, but buyers of this class are not prepared to take hold at the figures generally quoted, and there is some danger of parties from a distance unloading before those near at hand make up their minds what course to adopt. As a matter of fact, one of the leading Alabama companies made a sale of 7000 tons yesterday through Justice Cox, Jr., & Co.—price not definitely known, but believed to be not far from \$15, ex-ship Philadelphia, for quality similar to our Gray Forge. A fairly liberal movement among buyers during the coming week would enable sellers to maintain their position, but postponements for two or three weeks longer would subject the market to a severe strain. Quotations for standard brands range from \$18 to \$19, at tide, for No. 1 Foundry; \$17 to \$17.50 for No. 2, and \$16 to \$16.50 for Gray Forge. A few choice brands command a trifle more, and by the same rule concessions can be had on certain new brands, &c.

Foreign Iron.—Bessemer is still too high for this market, about \$20 being asked without attracting buyers' attention. Spiegel is offered at \$27 for 20%, with bids at from \$26.50 to \$26.75.

Blooms.—In fair demand at unchanged prices, say—Steel Nail Slabs, \$28.50 @ \$29, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms,

\$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 per "bloom" ton of 2464 lb.

Muck Bars.—Business is dull, with sellers at \$29, at mill, or \$29.50, Philadelphia. Bids for good sized lots are not obtainable within half a dollar of these prices, so that sales have been of a limited character.

Bar Iron.—The market is so irregular that it is almost impossible to report it satisfactorily. Some mills are still quoting 1.85¢ to 1.9¢, firm, but as they are full of orders for the next five or six weeks, they feel themselves in a position to hold out for their prices. Others want work to begin the New Year with, and quote 1.8¢, taking probably a little less when a desirable order is offered to them. There are still others a short distance from the city who quote about 1.75¢, f.o.b. cars, so that prices vary according to circumstances, although about 1.8¢ seems to be a fair average city quotation. It is difficult to say what the outcome will be. Prices ought to be higher than they are, and under a moderately good demand probably would stiffen a trifle, but to put them as they were five or six weeks ago would require some heavy buying. Prospects are said to be very encouraging, and we believe they are, but it is actual business that makes prices, and until that comes talk will avail but little. Skelp Iron is easier to buy, and sales of Grooved reported at 1.85¢, 1.87½¢ and 1.9¢, according to deliveries. Buyers are talking 1.8¢ @ 1.85¢, with chances somewhat in their favor.

Plate and Tank Iron.—There is no material change from last week. Leading mills are tolerably well supplied with orders for the balance of the year, and in some cases well into January, but there is a general feeling that the demand is not what it ought to be to secure uniformity in prices. There is a great deal of work in sight, however, and the chances after the turn of the year are fairly good both for full employment and better prices, but in the meantime business may be taken at low figures by those who are anxious to fill up at once. It is said that nearly 10,000 tons of Iron will be wanted by the pipe makers during the next four or five weeks. A few orders of that class would help the market wonderfully. Prices in the meantime are about 2¢ @ 2.1¢ for Ordinary Plates and Tank plates, 2.1¢ @ 2.2¢ for Universal Plates; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.25¢ @ 2.3¢; Shell, 2.7¢; Flange, 3¢ @ 3¼¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—Business has not improved to any extent, although the outlook seems to be more encouraging, and manufacturers are inclined to expect some large orders in the near future. Meanwhile while some mills are running full others are doing very little, and are in consequence a little weak on prices, which are still nominally as follows: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.8¢ for Beams and Channels, Iron or Steel.

Steel Rails.—The market is quiet, but firm at last week's prices. There are a few inquiries for fair-sized lots, but the general outlook does not indicate any material change from the conditions prevailing for some time past. Quotations are ordinarily \$28 at mill, but it is not unlikely that a little shading would be done on the right kind of orders. The demand for Steel in other forms is very large, and helps the mills greatly in the absence of Rail orders.

Sheet Iron.—There has been a very good demand for small lots in anticipation of the mills shutting down during the holiday season. Prices are very weak,

however, and on good sized orders special quotations are given. Small lots about as follows:

Best Refined, Nos. 26, 27 and 28....3¼¢ @ 3½¢
Best Refined, Nos. 18 to 25....3¢ @ 3¼¢
Common, ½¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28....4¼¢ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25....4¢ @ 4¼¢
Best Bloom Sheets, Nos. 18 to 21....3¾¢ @ 3½¢
Blue Annealed.....2.8¢ @ 3¢
Best Bloom, Galvanized, discount.....62½¢
Common, discount.....67½¢

Merchant Steel.—There is not much demand, and prices are unchanged, as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Old Rails.—There is not much demand at present, but owing to light stocks prices are steady and unchanged. There are buyers at \$23.50 for spot lots, with sellers for shipment at \$24. Store lots held for still higher figures.

Scrap Iron.—In fair demand but at somewhat lower figures. Asking prices about as follows: \$21 for cargo lots; \$21.50 @ \$22 for carload lots, delivered, or for choice \$22.50; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26; Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought Iron Pipe.—Business is rather quiet for this year's deliveries, but prices for such are steady and unchanged. The outlook for next year's business is thought to be very encouraging, although it may not come in to any extent until after the holidays. Meanwhile discounts on small lots are quoted as follows: Black Butt-Welded, 52½¢; Galvanized do., 42½¢; Black Lap-Welded, 62½¢; Galvanized do., 52½¢; Boiler Tubes, 60¢.

Nails.—The market shows no improvement, and prices are so ruinously low that efforts are again being made to bring about a restriction of output. Meanwhile prices are nominally \$1.90 @ \$2 from store, but carload lots of outside brands are quoted at extremely low rates without securing much business, although they demoralize the market.

Cleveland.

CLEVELAND, December 17, 1888.

Iron Ore.—Negotiations between the mine owners and furnacemen, regarding Ore for next year's delivery, are now going forward so rapidly that vessels have already been chartered to carry Ore from Escanaba to Cleveland during the entire shipping season. The rate is to be \$1.25 per ton, or 15¢ below the lake freight from Escanaba at the opening of navigation this year. The representatives in this city of the great mining districts anticipate a slight advance in Ore quotations next season, reasoning that the triumph of the protection policy has put new life into the Iron industry and that the moderate prices paid for Ore this year were in conformity with the inactive and discouraging condition of the Pig-Iron market during a greater portion of the year. Business for the past week has been confined quite exclusively to the sale of several 5000-ton lots of Ore now on the docks. It is now believed that by the close of the year considerably less than 100,000 tons of the Ore on the docks will remain unsold. Ore is being rushed down to the furnaces at a rapid rate, 28,000 tons having been forwarded last week. The railroad companies seem to have plenty of cars and the docks will soon be cleared. It is now considered an assured fact that an active buying movement will set in immediately after the holidays.

Pig Iron.—Dealers look upon the market as remarkably active for this season of

the year, with the holidays less than ten days ahead and a new year scarcely two weeks away. The demand for Mill Iron is persistent and a scarcity is already reported. Prices for Neutral Mill Iron vary from \$16.50 to \$17, and for Red Short from \$17.25 to \$17.75, cash. Bessemer and Foundry Irons are also selling well and the whole market is so much firmer than is usually the case in December that manufacturers are allowing the expectations for next year to have free play. A heavy month's trade is expected in January.

Nails.—Steel Nails are again quoted at \$2, after two months of fluctuating prices. Iron Nails are worth \$1.90, with only scattering sales reported.

Old Rails.—It seems next to impossible to buy Old Americans for less than \$25, at which figure scattering transactions are reported.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, December 17, 1888.

Pig Iron.—The present demand is such as to keep the yards clear of all desirable grades, and at prices that show no falling off. Sometimes sales are made for round lots at some concession; then again sales are being made at figures above the average ruling prices, the difference being sometimes in quality and reputation of the article; and then again the time that is given makes some little difference in prices, but upon the whole the average is up to \$14.25 for No. 1, at furnace bank. The demand for Pipe Iron keeps up remarkably well, and several round lots have been disposed of during the week. The fall and winter are generally considered off seasons with the Southern foundries, but, notwithstanding this, the demand from this section has been steadily on the increase, and the present month shows larger shipments to these parties than any previous period of the same length. Some efforts have been made quite recently by Northern capitalists to establish storage yards at the different furnaces, receiving such surplus iron that may be made over and above sales, and issuing warehouse receipts thereon, but, so far as heard from, have met with no practical results, as none of the furnaces have had any surplus to store in this manner.

Louisville.

LOUISVILLE, KY., December 17, 1888.

Pig Iron.—Since our last report the market has been dull, with but few sales of any note. It is hardly expected that there will be any marked improvement in the market during the balance of this year, as buyers seem to be holding off until after the first to make purchases. Furnaces are unwilling to make any concessions in prices, and we think the final result will be that buyers will have to make their purchases at furnaces' prices. Prices are lower this December than they have been for many years, and we think the market will take an upward tendency after the first of the year. There has been some little old material offered, but very few sales have been made lately. We quote as follows:

Southern Coke, No. 1 Foundry, new classification.....	\$16.25 @ \$16.75
Southern Coke, No. 2 Foundry, new classification.....	15.75 @ 16.25
Southern Coke, No. 3 Foundry, new classification.....	15.25 @ 15.75
Gray Forge.....	14.75 @ 15.25
White and Mottled, different grades.....	13.75 @ 14.25
Silver Gray, different grades.....	15.25 @ 16.25
Southern Charcoal, No. 1 Foundry.....	17.50 @ 18.00
No. 1 Mill.....	15.75 @ 16.75
Southern Car-Wheel, standard brands.....	22.50 @ 23.50
Southern Car-Wheel, other brands.....	18.75 @ 20.75
Hanging Rock Coke, No. 1 Foundry.....	16.75 @ 17.25

Hanging Rock Charcoal, No. 1 Foundry.....	20.50 @ 22.75
Hanging Rock, Cold Blast.....	21.75 @ 24.75
Hanging Rock, Warm Blast.....	18.75 @ 19.75

Detroit.

WILLIAM F. JARVIS & Co., under date of December 17, report as follows: There is considerable demand for Car Wheel Irons, and on this class prices are held very firm. There are some large deals on Gray Forge that will probably be closed in a few days, and although the deliveries are to run through the larger part of 1889, yet buyers are able to obtain concessions from present prices. Other grades of Southern Irons are offered at a little under figures at which they have recently been selling, but this cutting is confined to a few furnaces that are not in financial condition to hold, and want to place their output for several months ahead. Choice brands of Mahoning Valley Coke continue to be called for, and buyers are willing to pay the prices asked. Jackson County Silvers are also in good demand, several large orders at full quotations having been booked. With prices firm, except on some brands of Southern, and a good demand, we quote as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.75 @ 20.25
Lake Superior Coke, cinder mixed.....	18.00 @ 18.50
Standard Ohio Black Band.....	19.75 @ 20.25
Southern No. 1.....	17.75 @ 18.25
Southern Gray Forge.....	15.75 @ 16.25
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	20.50 @ 21.00

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, December 18, 1888.

Pig Iron.—Continues dull and the market is weaker; demand continues light, as consumers are buying only for immediate wants. However, while the market is weak at present, there is reason to believe that it will steady up again in the near future. Even now there are buyers for future delivery at a slight concession on present prices, but no sellers; while some furnacemen are making concessions in order to effect sales for immediate delivery, because they must have money, they are refusing to contract ahead, from which it is evident that there is a general belief of a more active and stronger market in the near future. That there will be an increasing consumption early in the new year there is not much doubt, with but little prospect of production being pushed much higher than it is now, as capacity is at present pretty fully employed. Prices have gone off within the past few weeks 25¢ @ 50¢ per ton on Mill Irons and \$1 on Bessemer. The decline in the latter was not unexpected, as it was higher relatively than Mill Iron. We quote prices as follows:

Neutral Gray Forge.....	\$15.75 @ \$16.00, cash.
All Ore Mill.....	16.50 @ 16.75, "
White and Mottled.....	15.00 @ 15.50, "
No. 1 Foundry.....	17.50 @ 18.00, "
No. 2 Foundry.....	16.75 @ 17.00, "
No. 1 Charcoal Foundry.....	23.50 @ 24.00, "
No. 2 Charcoal Foundry.....	21.50 @ 22.00, "
Cold Blast Charcoal.....	25.00 @ 27.00, "
Bessemer Iron.....	17.00 @

Sales of Bessemer were reported at \$17, cash, but so far as we can learn there have been no actual sales below that price. We are advised of well-known brands of Neutral Mill at \$15.75 @ \$16, cash, and other lots not so desirable at \$15.50, cash.

Muck Bar.—There is less inquiry and the market is weaker. We quote at \$28.75 @ \$29.50, cash. The latter is an extreme price, and can only be obtained for something very desirable for immediate delivery, both of which considerations are often very important with buyers.

Spiegel.—We can report a sale of Ferromanganese, 80 %, at \$56, cash, and Spiegel is quoted at \$27 @ \$28, cash, for 20 %.

Manufactured Iron.—There is less new business, as is to be expected at the close of the year, and the mills continue to be pretty well employed in working up old contracts. Bars are quoted at 1.75¢ @ 1.80¢; Plates, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢, all 60 days, 2 % off for cash. Skelp Iron is weaker and lower; Grooved, it is reported, has sold down as low as 1.75¢ @ 1.80¢, and Sheared at 1.95¢ @ 2¢. The falling off in the trade for Pipe has, as a matter of course, very materially curtailed the demand for Skelp Iron; this, however, is usual at the close of the year.

Nails.—There is but little inquiry for Nails here, which is owing to the fact that Pittsburgh makers are refusing to sell below card rates, on a basis of \$1.90 for 12d to 40d, 60 days, 2 % off for cash, whereas buyers claim to do better elsewhere. There are only two firms here at the present time paying attention to the Nail trade, Chess, Cook & Co. and Jones & Laughlins, and they are doing very little, owing to the cause noted. The Wheeling manufacturers have fixed prices at \$1.90, 60 days, 2 % off for cash, with the regular abatement of 10¢ per keg on carload lots and upward, which, with the discount for cash, brings the net price down to about \$1.77, which is still considerably below the price demanded by the Pittsburgh manufacturers.

Wrought-Iron Pipe.—The demand continues light, as it always is at this season of the year, and prices remain weak and irregular, so that it is difficult to give reliable quotations. It is, to use a common phrase, a go-as-you-please market, each firm being free to make its own rates, and those anxious for business are cutting very close, especially on desirable orders. We quote nominally as follows: Discounts on Black Brtt-Welded Pipe, 52½ @ 55 %; on Galvanized do., 45 @ 47½ %; on Black Lap-Welded, 62½ @ 65 %; on Galvanized do., 52½ @ 55 %; Boiler Tubes, 60 @ 62½ % off; 2-inch Tubing, 11½¢ @ 13¢ per foot, net; 5½-inch Casing, 38¢ @ 40¢.

Old Rails.—There have been very few sales reported during the past couple of weeks, but prices are still maintained: \$25 @ \$25.25, cash, for American Tees. Demand is light, as consumers—the end of the year being so near at hand—are buying only as their immediate wants necessitate. Old Steel Rails may be quoted at \$20.50 @ \$21 for long lengths and \$18.50 @ \$19 for short pieces.

Steel Rails.—Are still quoted at \$28, cash, on cars in Pittsburgh. The 17,000-ton contract secured by a Chicago mill, in regard to which so much has appeared in print during the past few days, it is claimed, was first secured by a Pittsburgh firm who were competing with Chicago for it and subsequently turned it over to the Chicago firm.

Billets, &c.—In regard to Bessemer Steel Billets, the market remains quiet and unchanged. Sales at \$28.50, cash. Nail Slabs quoted at \$28; Domestic Bloom and Rail Ends, \$19 @ \$19.50.

Railway Track Supplies.—Spikes are still quoted at \$2.15, 30 days; Splice Bars, \$1.85 @ \$1.90; Track Bolts, \$2.85, with Square, and \$2.95 with Hexagon Nuts.

Merchant Steel.—No change in prices. Best brands Tool Steel, 8½¢; Crucible Spring, 4½¢; do. Machinery, 5¢; Open-Hearth Machinery, 2½¢.

Old Material.—The demand continues light; prices unchanged. Sales No. 1 Wrought Scrap, \$21 net ton; Car Axles, \$25 @ \$26; Wrought Turnings, \$18 @ \$14;

Cast Scrap, \$15.25 @ \$15.50, gross; Cast Borings, \$12 @ \$13; Old Car-Wheels, nominal, \$20.

After January 1 the style of W. D. Wood & Co., Limited, will be changed to W. Dewees Wood Company, with general business offices at the works, McKeesport, and a branch office at 111 Water street, Pittsburgh. Communications to be addressed to McKeesport.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. |
CINCINNATI, December 17, 1888.

Pig Iron.—There has been a further contraction in the volume of business in Pig Iron during the past week in our local market and an easier feeling has prevailed, some transactions having been negotiated for prompt delivery on a lower level than for several weeks, but prices for long future delivery have suffered little change. But while the majority of sales made recently have been small, there has not been an entire dearth of large transactions. The local representative of a large Southern company has succeeded in placing considerable Iron East, mainly in Philadelphia, and local firms have also sold some round amounts of Southern and Northern Iron in Louisville during the past few days, one lot of "Pipe Iron" amounting to 3000 tons. Sales of Mottled Coke and Gray Forge Iron have been made for prompt delivery at \$14 and \$14.50 $\frac{1}{2}$ ton, cash, respectively. No. 1 Southern Coke Foundry Iron has been sold at \$16, showing a relaxation of 25¢ $\frac{1}{2}$ ton, and in general the trades consummated during the week have been more at the inside than at outside quotations. The disposition previously noted to hold off until the turn of the year has continued, and this fact has resulted in the easier tone noted, advantage of which has been taken by a few enterprising buyers. The demand for Car-Wheel Iron, especially for Woodstock, Shelby and Clifton, has continued active, and agents have much difficulty to make satisfactory disposition of the orders already booked. One feature of special prominence at present is the large movement of freight of all kinds, but largely of grain, from West to East. All the local roads have their full equipment in active employment, and are utilizing passenger crews to move freight. For this reason the adequate number of cars cannot be obtained to ship Iron. The following quotations are the approximate prices current here for cash, f.o.b. cars:

Foundry.	
Southern Coke, No. 1 (new classification).....	\$16.25 @ \$16.75
Southern Coke, No. 2 (new classification).....	15.50 @ 16.00
Southern Coke, No. 3 (new classification).....	15.00 @ 15.25
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	18.00 @ 18.50
Hanging Rock Charcoal, No. 1.....	21.00 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.....	17.50 @ 18.00
Forge.	
Strong Neutral Coke.....	15.00 @ 15.25
Mottled Neutral Coke.....	14.00 @ 14.25
Gray Forge.....	14.50 @ 14.75
Car-Wheel and Malleable Irons.	
Southern Car-Wheel.....	20.00 @ 25.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	21.00 @ 22.00

Manufactured Iron.—The local nearby mills have booked liberal orders for next year's delivery, placed by carriage builders, machine shops, &c., but the sales for present delivery are small. A firm tone prevails at previous prices and no change for the immediate future is foreshadowed. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet

Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, $\frac{3}{4}$ ¢ @ $\frac{4}{4}$ ¢ $\frac{1}{2}$ lb.

Old Material.—There has been a fair inquiry for both Old Rails and Wheels recently, with moderate sales of Rails at \$23 @ \$23.50 and of Old Wheels at \$19 @ \$19.50 $\frac{1}{2}$ ton, cash.

Nails.—There has been a moderate jobbing demand and a steady market. Jobbing prices are based upon 12d @ 40d, which sell at \$1.95 $\frac{1}{2}$ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$1.95 and Steel Wire Nails at \$2.65 $\frac{1}{2}$ keg.

A new firm for the sale of Pig Iron and general commission has been created here during the week. The style of the firm is Van Vorhees & Smith, representing the firms of George W. Stetson & Co., of Boston and New York, and Edmund D. Smith & Co., of Philadelphia. Rooms have been secured in the Johnson Building. Mr. Blandy, recently connected with Rogers, Brown & Co., is the local representative of the branch office. The business controlled is considerable.

New York.

Office of *The Iron Age*, 66 and 68 Duane street. |
NEW YORK, December 19, 1888.

Foundry Pig.—Although the Thomas Iron Company have not yet formally opened their books, they have entered orders during the week for 1889 delivery from regular customers to the total of about 12,500 tons, the price to be fixed later on. This brings the total of their engagements, as we are informed by B. G. Clarke, to about 40,000 tons, a part of which is Iron the delivery of which cannot be completed this year. We hear well-authenticated reports of some cutting by Southern furnaces, growing out of the necessity to meet financial obligations, and learn of offers of No. 2 Northern Iron, for Forge purposes, at a cut of 25¢, to induce anticipating of orders. We quote: Standard to Choice Foundry, No. 1, \$18 @ \$19.50; No. 2, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—We quote Coltness, \$21, nominally; Shotts, \$20.25 @ \$20.75; Langloan, \$20.25 @ \$20.75, and Dalmellington, \$19.50 @ \$19.75.

Spiegeleisen.—We quote nominally, in the absence of business, \$27 for 20 % Spiegeleisen, and \$54 for 80 % Ferromanganese.

Plates.—We quote Iron Tank, 2¢ @ 2.2¢; Shell, 2.25¢ @ 2.4¢; Steel Tank and Ship Plate, 2.15¢ @ 2.25¢; Shell, 2.35¢ @ 2.5¢; Flange, 2.6¢ @ 2.75¢, and Fire-box, $\frac{3}{4}$ ¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2¢ @ 2.10¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢ on dock for all sizes. Foreign Beams are quoted 2.55¢ @ 2.75¢.

Bar Iron.—We quote: Carload lots on dock, half extras, Common; 1.7¢ @ 1.75¢; Medium, 1.75¢ @ 1.8¢, and Refined, 1.8¢ @ 2¢.

Steel Rails.—Sales east of the Allegheny Mountains have been confined to small lots aggregating between 6000 and 8000 tons at private terms. There is little business in sight in the immediate territory of the Eastern mills, but inquiries are at hand from the South, which may be taken by them if the Western mills continue to hold at the prices which they quote. Considerable stir was created by the report in the newspapers that a Chicago mill had taken an order for 17,000 tons for the Union Pacific at a price equivalent to \$27.50 at Chicago. This is

the order secured first by a Pittsburgh mill at \$30, plus bridge toll, delivered at Omaha. For a consideration, this mill transferred the work to the Chicago concern, partly because the former found it somewhat difficult to arrange for the delivery required. The opinion is expressed, too, that the transfer implied the withdrawal from competition on some business now pending. Negotiations are under way for some important orders, with the probability that they will be closed before the new year. Buyers have been holding off, in distrust of the stability of the higher prices being asked by the mills. The report of the Board of Control shows the sales for 1888 delivery to have been, up to December 1st, 1,251,177 gross tons, and the actual deliveries 1,116,788 tons. The sales for 1889 delivery reported up to December 1st aggregated 270,671 tons. Transactions closed since then will swell the total to at least 400,000 tons, not counting the business done by the Allegheny Bessemer Steel Company, who are not in the association, and not counting, of course, Light Rails, which are not included in the allotments.

Merchant Steel.—Purchases are being made only from hand to mouth. The market continues demoralized. As an instance, we may cite the case of Tire Steel, of a size which would have brought 0.4¢ extra under the old scale, selling, delivered, at 2.1¢, flat—a cut of about $\frac{1}{4}$ ¢.

Wire Rods.—There is some inquiry and a moderate amount of business, \$39.50 being asked for early steamer shipment for Basic Rods and \$39 for shipment, at the option of the seller, by steamer. In Germany the rank and file of Rod makers ask prices too high to allow of business here, but there are occasional sellers under the market, whose offerings are sufficient to supply the limited requirements of this country, their quotations being about 104/, shipping port.

Old Rails.—We are not reported any business, which is due to the absence of any local supply at prices which buyers are willing to pay. There is more inquiry for round blocks by several Eastern mills. For future shipment—say the early months of next year—Foreign Double Heads have been offered at \$23.75 here.

Cotton Ties.—Importation orders have ceased and business is confined to supplying the smaller trade from stocks at Southern Atlantic Gulf ports. For such business 95¢ @ \$1 is named, at New Orleans, per bundle.

Rail Fastenings.—Among the recent sales of Spikes is a lot of 5000 kegs to a Western road. Steel Angles have been weakening.

Financial.

During the week there has been a temporary increase of demand for merchandise, in anticipation of the advance in railroad freights, which took effect on Monday. The presence of Western and Southern jobbers in the dry goods market was particularly noticed. For a similar reason the east-bound shipments from Chicago were very heavy, the total being 77.-125 tons, against 59,623 tons for the previous week and 48,598 tons for the corresponding week last year. An encouraging feature is afforded by the preliminary statement of exports for November, which, for the first time in six months, compares favorably with the corresponding month last year. An examination of the several items shows that while the aggregate has doubled since July the increase is almost wholly due to the movement in cotton. Breadstuffs and provisions are going out on a much reduced scale. The adjustment of railroad difficulties is still in progress,

but Judge Cooley, chairman of the Interstate Commerce Commission, who has been investigating the rate-cutting wars on Northwestern roads, is not sanguine of a permanent settlement until the law has been somewhat amended. He says no bill to repeal the law will succeed in Congress. President Charles Francis Adams, of the Union Pacific, says that it is the absence of good faith among railroad officials which has brought about such rate cutting, but the primary cause is a craze for railroad construction. Transcontinental rates will be advanced 20 % January 1, and a new tariff will soon be issued. Twenty-four suits, aggregating \$120,000, against the Rock Island Railroad, alleging extortionate rates, have been begun at Davenport, Iowa.

The Stock Exchange markets have been active and generally strong. On Thursday, excepting the coal stocks and Union Pacific, the tone was weak, partly on account of lower prices in London. On Friday stocks were very dull and closed on a fractional decline. The reports of rates being restored in the West were offset by heavy engagements of gold for export and the collapse of the Panama Canal scheme in Paris. On Saturday the favorable bank statement caused a noticeable improvement. Prices in Europe were a fraction lower, owing, it was said, to the failure of the Panama Canal loan. More strength was developed on Monday, the coalers leading. There was more buying by prominent operators on the improved railroad situation East and West, with an important advance in London. On Tuesday the market was moderately active and lower. Efforts to realize were aided by reports that east-bound rates were not mentioned.

United States bonds were strong and in good demand. Quotations as follows:

U. S. 4s, 1891, registered.....	108½
U. S. 4s, 1891, coupon.....	108½
U. S. 4s, 1907, registered.....	127½
U. S. 4s, 1907, coupon.....	128½
U. S. currency 6s.....	119

The general markets are quiet. Cotton is in light demand and ½¢ lower. Wheat and flour are alike dull, millers declining to purchase, and wheat exports are entirely suspended. Corn is quiet and weak. Refined oil is a shade stronger and cottonseed oil decidedly so. The gradual upward tendency in hemp, owing to the scarcity, has resulted in a further advance of ½¢ for both Manila and Sisal. Cash lard a turn dearer. Salt is unchanged. Raw sugars are easier. Wool is quiet but strong. Ocean tonnage is scarce, rates well sustained. Provisions are on a stronger basis. Raw silks have advanced 2½ to 3 francs in France and 40 to 50 Mexican dollars in Japan.

The considerable increase in surplus reserve shown by the weekly bank statement, amounting to \$2,468,400, was an agreeable surprise, it appearing that the large Treasury disbursements, including payments on account of pensions as well as bonds purchased and interest falling due, more than offset the heavy exports of gold. The surplus now held is \$9,672,225, against \$7,928,400 at the corresponding time last year and \$4,008,200 in the third week of December, 1886. In loans there was a contraction of \$3,101,300. According to the Custom House report the exports of specie from this port during the week amounted to \$5,693,505, making a total since January 1 of \$44,087,000, as compared with \$17,586,000 for the same time last year, and nearly \$47,000,000 in 1886. The imports of specie for the week were \$87,000, and since January 1 \$7,097,000. It is surmised that shipments to London may continue, but no apprehensions of undue stringency from this source are felt. The common impression is that, with the large current exports of cotton and so large a proportion of the corn crop yet to

come forward, together with an improved railroad situation, the new year will enter with a better tone in financial circles. Rates for money on call advanced to an average of about 3%. Time loans on good collateral were made at 4 % for two or four months, and at 4 @ 5 % for four to six months. Commercial paper was in good demand, the supply being moderate. Rates were for 60 to 90 days' indorsed bills receivable 5 @ 5½ %, for first-class four-months' commission-house names 5½ @ 6 %. The total amount of bonds purchased to date under the circular of April 17 is \$100,686,200, of which \$51,396,650 were 4 per cents, and \$49,289,550 were 4½ per cents. The cost of these bonds was \$119,247,668, of which \$66,010,877 was paid for the 4 per cents and \$53,236,791 for the 4½ per cents.

Sterling is firm, with posted rates at \$4.85½ @ \$4.90. The Bank of England rate is 5 %, and with possible money complications in France, connected with the Panama Canal failure, easier rates are not expected. Germany, to meet demands in the Argentine Republic, draws on New York.

The clearings of 39 cities for the week ended December 15 show an increase of 6.6 %. Outside of New York the increase is 3.3 %. New York increased 6.9 %, Boston 2.2 %, Chicago 3.9 %, St. Louis 8.9 %, San Francisco 6.1 %, Cincinnati 5.9 %, Pittsburgh 4.8 %, Minneapolis 13.7 %, Omaha 19.3 %, Topeka 16.2 %, Kansas City 32.2 %, New Orleans 22.4 %, Louisville 25.8 %, Memphis 36.9 %, Denver 44.3 %, Columbus 25.3 % and Galveston 46.3 %. Philadelphia decreased 0.4 %, St. Paul 2.9 %, Duluth 49 % and Wichita 34.8 %.

The total exports of breadstuffs for November show a decrease over the same month last year of \$1,794,000. The decrease is chiefly in wheat and wheat flour. For the five months ending November 30 the decrease in total exports of breadstuffs is \$12,000,000 over the exports for the same period last year, and for the 11 months ending November 30 the value was \$100,622,453, against \$148,019,669 during the corresponding months of 1887, a decrease of over \$47,000,000. The total exports of beef and hog products for November show a decrease of about \$500,000; of dairy products, of about \$300,000. Exports of cotton show an increase of about \$1,300,000. The total value of our exports of mineral oils during the 11 months which ended November 30 was \$42,549,492, against \$41,246,286 during the corresponding period of last year.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from December 7 to December 13, inclusive, and from January 1 to December 13, inclusive, were as follows:

Iron and Steel.

	Dec. 7. to Dec. 13. Tons.	Jan. 1 to Dec. 13. Tons.
Pig Iron: Crocker Bros.....	760	15,384
G. W. Stetson & Co.....	300	14,750
R. Crooks & Co.....	200	300
Jas. E. Pope, Jr.....	100	250
N. S. Bartlett.....	100	5,500
E. Foley.....	75	275
Page, Newell & Co.....	25	38
Spiegelcisen: Naylor & Co.....	300	12,032
Steel: A. Milne & Co.....	111	1,374
Oelrichs & Co.....	64	762
Thos. Prosser & Son.....	60	220
W. F. Wagner.....	34½	1,481½
R. H. Wolff & Co.....	48	736
Union Bridge Company.....	28	28
Chas. Hugill.....	6	304½
C. F. Baker.....	6	234½
Schulze & Ruckgaber.....	6	6
J. Abbott & Co.....	5	573
F. S. Pilditch.....	4½	514½
Newton & Shipman.....	4½	154½
Montgomery & Co.....	1	93
H. W. Belcher.....	1	23
Steel Billets: J. Abbott & Co.....	563	2,344
A. Milne & Co.....	385	1,395
Steel Sheets: Naylor & Co.....	48	577
Pierson & Co.....	22	1,108
Lalanc & G. Mfg. Co.....	21	526
R. Crooks & Co.....	16	360

Steel Blooms: Naylor & Co..	51	2,566
Steel Bars: Union Bridge Company.....	12	271
Steel Bloom Ends: Dana & Co.	60	1,469
Steel Wire Rods: R. H. Wolff & Co.....	90	90
Steel Tubes: J. S. Leng & Co..	4	56
Iron: J. Abbott & Co.....	217	7,489½
G. Lundberg.....	69	806
R. F. Downing & Co.....	50	365
Iron Wire Rods: J. Abbott & Co.....	215	814
Swedish Bar Iron: C. v. Philp.....	40	668
Scrap Iron: James E. Ward & Co.....	150	260
J. Abbott & Co.....	25	231
Sheet Iron: T. B. Coddington & Co.....	30	1,404
Swedish Rough Bars: C. v. Philp.....	100	590
Boiler Scrap Iron: A. Milne & Co.....	110	110
Charcoal Iron: A. Milne & Co.	101	230
Page, Newell & Co.....	50	448

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	9,699	546,968
A. A. Thomsen & Co.....	7,877	160,168
Dickerson, Van Dusen & Co...	6,573	269,242
Bruce & Cook.....	3,510	100,511
Central Stamping Company..	1,547	36,996
Jas. Byrne & Son.....	1,530	36,331
S. Shepard & Co.....	1,277	20,718
N. L. Cort & Co.....	1,062	113,070
Lombard, Ayres & Co.....	1,060	15,225
Corbiere, Fellows & Co.....	1,047	9,081
R. Crooks & Co.....	880	66,147
E. S. Wheeler & Co.....	747	11,505
C. S. Merstick & Co.....	730	7,458
Lalanc & G. Mfg. Co.....	648	6,070
G. B. Morewood & Co.....	600	48,762
H. R. DeMilt & Co.....	625	17,837
Merchant & Co.....	568	24,348
J. M. Warren & Co.....	301	1,051

Metals.

	Pounds.	Pounds.
Tin: Bidwell & French.....	110,202	567,897
Naylor & Co.....	56,219	3,719,622
A. A. Thomsen & Co.....	21,361	254,058
Antimony: Edw. Hill's Sons & Co.....	200	1,800
Hendricks Bros.....	34	270

Irons and Metals Warehoused from December 7 to December 13, inclusive:

	Tons.
Iron: J. Abbott & Co.....	100

Hardware, Machinery, &c.

American Meter Company, Mdse., cs, 4
Baker, Hermann & Co., Arms, cs, 9; Mdse., cs, 25.
Field, Alfred & Co., Mdse., cs, 15
Folsom Arms Company, H. & D., Arms, cs, 2
Foley, Edward, Mch'y, pkge., 1; do., case, 1;
Bolter Plates, 102
McDermott, W. W., Steel Shoes, 20; Dies, 30;
Rings, 2
Mumford, Cary & Co., Nails, bags, 569
Newton & Shipman, Files, cks., 6
Pardo Velazco & Co., Hdw., cs, 5
Rotterdam Steamship Company, Arms, cs, 4
Sheldon, Geo. W. & Co., Mch'y, package, 1
Schoverling, Daly & Gales, Arms, cs, 4
Taylor Thos., Mdse., cs, 5
Ward, Asline, Mdse., cs, 5
Wiebusch & Hilger, Lim., Mdse., cs, 16; Arms, cs, 5; Hdw., pkgs., 10
Witte, John G. & Bro., Cutlery, cs, 13
Order: Shovels, cs, 2; Files, cks., 13; Hdw., pkgs., 18

Exports of Metals.

	Dec. 7. to Dec. 13. Pounds.	Jan. 1. to Dec. 13. Pounds.
Copper: J. Abbott & Co.....	13,122,530	13,122,530
Lewisohn Bros.....	4,041,522	4,041,522
F. A. Lomal.....	2,541,293	2,541,293
American Metal Company..	6,018,291	6,018,291
G. H. Nichols.....	223,689	223,689
J. Bruce Ismay.....	112,000	112,000
S. Mendel.....	560,000	560,000
Ledoux & Co.....	110,276	110,276
Muller, Schall & Co.....	430,000	430,000
Copper Queen Con. M. Com- pany.....	224,034	224,034
J. Kennedy, Tod & Co.....	112,028	112,028
H. Becker & Co.....	1,250	1,250
Orford C. & S. Rfg. Company	449,881	449,881
Robt. M. Thompson.....	125,000	125,000
Thos. J. Pope, Sons & Co.....	1,451,130	1,451,130
Williams & Terhune.....	99,820	99,820
J. Parsons & Co.....	420,000	420,000
Naylor & Co.....	448,809	448,809
Jas. E. Pope, Jr.....	167,500	167,500
Bridgeport Copper Com- pany.....	112,000	112,000
C. Herold.....	250,000	250,000
Phelps Bros.....	6,250	6,250
Burgess & Co.....	51,840	51,840
R. W. Jones.....	189,984	189,984
Ladenburg, Thalmann & Co.	229,371	229,371
W. H. Crossman & Bro.....	4,000	4,000
R. Crooks & Co.....	1,000	1,000
Copper Matte: Williams & Terhune.....	363,632	363,632
Lewisohn Bros.....	3,021,610	3,021,610
American Metal Company..	4,984,520	4,984,520
J. Abbott & Co.....	367,447	367,447
C. Ledoux & Co.....	399,900	399,900
F. W. J. Hurst.....	184,238	184,238
G. H. Nichols.....	722,777	722,777
H. T. Nichols & Co.....	189,984	189,984
Kunhardt & Co.....	41,652	41,652
Copper Ore: American Metal Co.....	71,680	429,180

Metal Market.

Copper.—The London market seems to sink, for the time being, into as listless a mood as our own, sales there for the week having been restricted to 275 tons all told, and prices unaltered: Chili Bars, spot, £97. 10/; ditto., futures, £78; good merchantable brands, £77. 10/ @ £78, but Best Selected declining from £80. 10/ to £80. Here very little transpired, one December contract selling at 17.40¢, and one January ditto. at 17.15¢. At the close December may be quoted 17¢ @ 17.15¢, and January, 17¢ @ 17.10¢. The financial disturbance in Paris growing out of the suspension of the Panama Canal Company temporarily depressed Rio Tinto shares in that city, but they recovered 11 francs yesterday. In Boston there was also a decline in Copper shares of from 2 to 8 points, but there seems to be little apprehension that the French syndicate will for the present be in any shape affected by the financial events in the French capital. It may take a week or two before the Panama Canal Company's immediate fate will be decided. The import of American Copper into Liverpool and Swansea the first 11 months has been 22,562 tons Fine, against 14,087 same time last year. The export of Pyrites from Spain during the first nine months has been 629,600 tons, against 594,779 tons last year and 515,094 in 1886; of Precipitate respectively, 21,239, 19,499 and 20,672 tons. New Copper mining companies are being organized in a good many quarters, from Portugal to New Zealand; after a while they may begin to tell on production unless the syndicate buys them up one after the other.

Tin.—Has again declined slightly in the London market, spot Straits from £98. 5/ to £97. 5/, and futures from £98. 15/ to £98. during the week. Sales 550 tons. In our own market there has been a persistent dead calm at 21½¢, nominally, for 10-ton lots, and 22¢ in a jobbing way. As per cable dated December 18 from Gilfillan, Wood & Co., Singapore, to Mr. Charles Nordhaus, New York, the Straits shipped this way December 1 to 15 150 tons, against 100 tons last year, and to England 1200, against 1200. Since January 1 to this country 3550, against 4250 in 1887, and to England 18,100, against 15,950. **Tin Plates.**—The demand for spot goods is only moderate at unchanged prices. Some orders for forward delivery have been booked during the week, but makers refuse to make sufficient concessions to bring in the bulk of the business offering, which is still held in abeyance awaiting a change in the market. Liverpool is quoted 3d. higher in the meantime, Coke being cabled 13/3. We quote, large lines, 3 box: Siemens-Martin Steel, Charcoal Finish, \$4.75 @ \$5.50; ditto, Coke Finish, \$4.65 @ \$4.70; Terns, \$4.12½ @ \$4.25; Coke Tins, \$4.22½ @ \$4.30; and Wasters, \$4.12½ @ \$4.15.

Lead.—Although hardly anything beyond a mere jobbing trade has been done in Common Domestic, the market winds up stronger at 3¼¢ here and 3.55¢ in St. Louis. As long as the 15,000 tons of Corwith stock overhang the market, the bulk thereof here, business in Lead will be of a skirring nature merely, and besides this is about the dulllest time of the year, so that for the moment Lead attracts but little attention. Some 800 tons are to be offered at auction to-day. Spanish exportation of Pig Lead the first nine months has been 97,917 tons, against last year 99,168 and in 1886 82,591 tons. In London Soft Spanish improved from £12. 7/6 to £12. 10/, and English Pig is cabled £12. 15/.

Spelter.—Has remained inactive here at 5¢ @ 5½¢, Common Domestic, ordinary brands, and Silesian at 5¼¢, both nom-

inally, while in London the quotation for the latter remains £18. 5/. The International Syndicate in Europe is advocated to be renewed for 3½ years, to date from July 1 next, with an allowed increase of 5 % in production. This is what the German and Belgium smelting works recommend already. Spanish Calamine exportation during the first nine months has been 23,105 tons, against 20,698 in 1887 and 21,140 in 1886.

Antimony.—Has been moderately active at 12¼¢ @ 13¢ Cookson, and 10¼¢ @ 11¢ Hallet, the latter being £45 in London.

New York Metal Exchange.

The following sales are reported:

THURSDAY, December 13.	
25,000 lbs. Lake Copper, December.....	17 40¢
FRIDAY, December 14.	
32 tons Lead, December.....	3.70¢
25,000 lb Lake Copper, January.....	17.15¢
80 tons Copper, January.....	3.70¢
96 tons Lead, January.....	3.75¢

Coal Market.

We learn that the Reading, Lehigh Valley and New Jersey Central will close their collieries from December 22 to January 2. This does not affect individual collieries.

The wholesale Anthracite Coal market is dull and weak, from the effects of accumulated surplus. The increase at tide-water shipping points during November was 210,000 tons. The stock on the 30th ult. was 569,238 tons, and since then production has fallen off 100,000 tons, the total for the week ending 15th inst. having been 680,859 tons, which, however, is a decrease of only 28,000 compared with the previous week. Compared with the corresponding week last year the decrease is nearly 100,000. From January 1 to November 30 the production was 35,441,795 tons, against 31,572,939 tons in 1887, an increase of 3,868,855 tons. The year 1888 is the banner year in the history of this industry, both as to the volume of trade and general condition. There is no complaint that business is done at a loss. The Reading is the only company that reports a decrease of tonnage. The facilities for production next year will be increased to nearly 45,000,000 tons. Among other improvements the Lehigh Valley Coal Company is surveying a railroad which will open a rich valley north of Mount Carmel, Llewellyn and Nagle. They have built a new breaker and will reopen the abandoned Black Diamond mine. Sales of Lehigh are reported as low as \$3.50 @ \$3.90 ¢ ton, f.o.b., for Broken and Egg, and there are reports of cutting in other directions.

Bituminous Coal prices are dull and weak, as a consequence of free production, but the pool basis of \$3.25, f.o.b., is still quoted. The Seaboard Association held a meeting to secure the co-operation of the Beach Creek Railroad, which this year has produced over 1,500,000 tons, but no final action was reached. The Clearfield and Cumberland last week reported 145,000 tons. Philadelphia papers report that R. B. Wigton & Co., Bituminous Coal shippers, are about to sue the Pennsylvania Railroad Company for damages for alleged discrimination in freight rates.

Heavy floods at Carbondale, Shenandoah, and Pittston are reported, causing much damage. At Mt. Carmel work at the collieries will not be resumed until next year.

A cargo of Alabama coal is being shipped from Pensacola to Cuba, to which point the parties concerned have shipped 100,000 tons per annum from Pennsylvania. Efforts are making to build up a large trade from the Alabama mines to the seaboard.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Dec. 19, 1888.

Operations in Copper have been comparatively small and without other feature than that the "syndicate" agents freely met the demand at unchanged prices. Consumers have no greater faith than heretofore in the stability of prices, and consequently purchase supplies only as required to tide over immediate wants. The rumor has been circulating that the syndicate contemplate a reduction in prices for the new year, as a means of inducing consumers to purchase with greater freedom. The foundation for the report is, however, of a doubtful character. Furnace material is difficult to sell, and mainly for the reason that outside of the "syndicate" the outlet for Bars is very limited. In this connection it may be stated, as a matter of more than passing interest, that the accumulation of Bars in the hands of the "syndicate" is due in a measure to the fact that they necessarily have to purchase, in the form of good merchant Copper, nearly all the Matte sold to smelters in the crude form.

Apropos of the recent sales of Lake Superior Ingot to American consumers, it is reported on semi-official authority that the quantity was 10,000 tons and the price £87. 6/, less 2½ %, leaving, it is calculated, a net profit of £8 ¢ ton, to the syndicate. A report has had circulation on the market here to the effect that the "syndicate" has closed with the Anaconda Company for its entire production the first half of 1889 at market value.

Block Tin has ruled lower again under the weight of renewed reports of probable heavier shipments from the Straits, together with lack of outside speculative interest in the market. The demand has improved somewhat the past few days, however, with the result of toning the market somewhat.

There has been no radical change in the Pig Iron market. Operators in "warrants" are inclined to defer operations until the makers' returns are published, and home consumptive demand is only fair. The purchases of Scotch brands for Italian account are quite large, but American buyers purchase sparingly. The demand for Middlesboro' Pig has slackened, and stocks are now increasing at that point, without, however, unfavorable bearing upon prices.

The Steel trade continues active, particularly in the railway and shipbuilding supplies departments. Prices are still firm in those branches while somewhat irregular in others. Among transactions reported the past week is an order for 21,000 tons Steel Rails and 1200 tons Sleepers, secured by Bolckow, Vaughan & Co.

Hawks & Crawshaw, Gateshead, have discontinued making Steel. The Cyfarthfa works have started up 16 puddling furnaces and three mills for the manufacture of Bars.

Tin Plate makers report more numerous inquiries the past week, and in many instances buyers and sellers have met on prices, with the result of a good business being put through. There is a better tone to the market, and sellers have refused to duplicate orders at the lowest prices ac-

cepted recently. The old Lodge Iron Works have been purchased for £2500, and will be converted into a Tin Plate works.

Scotch Pig.—There has been a fair business at generally steady prices.

No. 1 Coltness, f.o.b. Glasgow	50/6
No. 1 Summerlee, " "	50/
No. 1 Gartsherrie, " "	48/6
No. 1 Langloan, " "	50/
No. 1 Carnbroe, " "	44/6
No. 1 Shotts, " at Leith	49/6
No. 1 Glengarnock, " Ardrossan	48/
No. 1 Dalmellington, " "	43/3
No. 1 Eglinton, " "	42/
Steamer freights, Glasgow to New York, 3/, Liverpool to New York, 10/.	

Cleveland Pig.—Demand has continued slow, and the market is rather weaker. No. 1 Middlesboro', G. M. B., 36/6; No. 3 do., 33/9.

Bessemer Pig.—The transactions have been large, but at irregular prices. West Coast brands, mixed numbers, 44/6 @ 45/, f.o.b. shipping point.

Spiegeleisen.—Inquiries are not so numerous, but prices held firmly. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—There continues to be a good business, and prices are held firmly. Standard English sections quoted at £4, and light sections £4. 2/6 @ £4. 12/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—Demand very moderate and prices nominal. We quote £3. 18/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A fair business reported, at firm prices. Bessemer, 2½ x 2½ inch, £4. 1/3, f.o.b. at N. W. England shipping point.

Steel Slabs.—The market steady with demand fair. Bessemer, £3. 18/6, f.o.b. at N. W. England shipping point.

Old Rails.—Holders firm at previous prices, but the demand slow. Tees quoted at £3. 5/ @ £3. 7/6, and Double Heads, £3. 8/ @ £3. 10, c.i.f. New York.

Scrap Iron.—A moderate business doing at old prices. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Crop Ends.—The demand moderate, and prices unchanged. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—No material change in prices. Bessemer fair. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/3	@ 15/6
IC Bessemer steel, Coke finish	13/6	@ 13/6
IC Siemens	13/9	@ 13/9
IC Coke, B. V. grade	13/	@ 13/3
Charcoal Terne, Dean grade	12/	@ 12/3

Manufactured Iron.—The market continues strong and is fairly active. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d.	£ s. d.
Common	@ 8	2 6
Staff. Bl'k Sheet, singles	@ 5	12 6
Welsh Bars (f.o.b. Wales)	5 0 0	@ 5 2 6

Tin.—Trading larger this week, but the market unsettled. Straits quoted at £97. 5/, spot, and £98 @ £98. 5/ for three months' futures.

Lead.—The market very quiet and rather weak. Soft Spanish, £12. 10.

Spelter.—A fairly active business without material change in prices. Silesian, ordinary, £18. 5/.

Copper.—Speculative dealings in Chili Bars have been larger at unchanged prices. Best Selected sold at £5 decline from late

nominal price. Chili Bars, £77. 10/, spot, and £78, three months' futures. Best Selected, £75.

Tin Mining at Perak.

A correspondent of an Eastern journal, describing a visit to the Malay State of Perak, reminds us that it is only about ten years since the British Government found it necessary to interfere forcibly in the affairs of Perak, and practically to place its affairs under the control of the Resident, Sir Hugh Low. A steamer now runs daily from Penang to Larut, whence the thriving town of Taeping is reached by a short railway. From this place the capital, Kwala Kansar, is reached by coach. Taeping is thoroughly a Chinese town of the modern kind, and the Chinaman appears perfectly happy there.

The tin mines are just outside the town and cover an area of several square miles and are worked wholly by Cantonese. They are a series of hollows having the appearance of quarries; enormous numbers of coolies, working like so many ants, convey the sand or rubble to the washers' troughs, which are placed at a sufficient height to allow of the water running freely down an incline. One man takes up the minute portions of tin, having the appearance of points of black lead, and which sink at once to the bottom of the trough; others pick up stones from the gravelly mixture; others again push up the heavier portion of the mud from which the tinstone is not yet completely separated, so that it may pass through the water again and nothing be lost. The ore is then washed once more in special washing-houses and is thrown with charcoal into a simple furnace, like a barrel standing on end, and made chiefly of clay; the molten lead oozes down through the charcoal and escapes through a hole in the bottom into a pit hollowed out of the ground, the tin being left. The tin molds are simply holes pressed into the sandy floor by circular wooden rollers, each consisting of half a section, with broad, wooden lips, which leave indentations similar in shape to the blocks of tin shipped abroad. The tin is left here for several days to cool, when it is hauled out with a long iron rod and dashed with water.

It is curious that the only tin mine in Perak supplied with adequate machinery and worked by Europeans fails to give a profit, while the Chinese with their primitive methods can turn the most unpromising mine to advantage. Kwala Kansar consists simply of one business street of Chinamen, the Malays living about in the jungle doing little. New roads are being laid out in every direction under the superintendence of the Resident, and the great trunk road is being continued inland, so as to reach the tin mines of Kinta, the produce of which now reaches the coast by water.

E. P. Allis & Co., of Milwaukee, Wis., have put in operation their long contemplated scheme of furnishing dining facilities to their employees. They have fitted up a large room in their office building for a dining hall, in which any employee can obtain his midday refreshment for a nominal sum. No compulsion is exercised, but each person is free to avail himself of the opportunity if he desires. No change has been made in the length of the noon-ing in consequence of the new arrangement, so that the employees have a longer time for rest and social intercourse than they would have if they were obliged to go some distance from the works to get their dinners. Those who were formerly in the habit of carrying their lunch and eating it cold can now get hot dinners, and will be

able to work better, both to their own advantage and to that of the firm. Representatives of the various departments find the new arrangement a great convenience, as the dinner table becomes a favorite place for the discussion of various business matters, and the interchange of ideas and opinions. The more agreeable the surroundings are at lunch time, and the more appetizing the luncheon itself, the better will the workmen feel, and possibly the better engines they will turn out for E. P. Allis & Co.

W. S. Kessler & Co., well known to the iron trade of Chicago and vicinity as manufacturers' agents for the sale of iron and steel, bolts, nuts and railway supplies, have made arrangements to enter an entirely different line of business. They have established the Albion Malleable Iron Works, at Albion, Mich., their office being at the works. They will use the building vacated by the Gale Mfg. Company, who have erected larger works for the manufacture of plows. The building is 100 feet front by 400 feet deep, constructed of brick, and is three stories high in front. Messrs. Kessler & Co. are now putting in an air furnace of the most improved type with the necessary annealing ovens. They expect to be ready for business by the 1st of February, and will then be prepared to take orders for any kind of malleable castings, their specialty being castings for agricultural implements. They will employ from 75 100 hands and will make from 10 to 15 tons of castings daily.

The Louisville Southern Railroad was completed last summer under the management of Col. Bennet H. Young, forming with the Cincinnati Southern a competing line to the Louisville and Nashville system for Southern trade. Since the construction of the road a great many surmises and reports have been afloat as to what combination would absorb the new outlet. All rumors were set at rest on the 14th inst., when it was announced officially that the Louisville, New Albany and Chicago road had leased the Southern for a term of 30 years, making a through trunk line from Chicago to all points South and Southwest reached by the Cincinnati Southern road. The L. W. A. & C. guarantees the interest on the Southern's bonds, besides agreeing to divide net profits with stockholders over and above expenses. The former road has heretofore entered Louisville over the Pennsylvania Company's bridge across the Ohio River, but will probably soon come over the Kentucky and Indiana bridge, which was built and is operated in connection with the Southern road.

The sales agency for the pig iron of the Woodward Iron Company for Chicago and the Northwest has been taken by Rogers, Brown & Co., 98 Dearborn street, Chicago. The Woodward Company are now operating two furnaces and making 200 tons daily. Rogers, Brown & Co. also represent the Nashville two furnaces and the large new coke furnace, at Gadsden, making the Etowah brand. They will sell the product of the new Trussville Furnace, just being completed, near Birmingham, by Pennsylvania iron men.

The American Institute Fair was visited by 200,000 persons.

The imports of merchandise at this port during the week were valued at \$7,854,000, of which \$2,089,000 represent dry goods. Since January 1 the total is \$444,169,000, against \$449,000,000 for the same time last year.

Hardware.

Merchants and manufacturers are more occupied in closing up the year's business than in taking care of current orders, the demand in general being quite limited. But few changes in prices are announced, and new goods, revision of lists, and other matters relating to next season's trade are withheld until the opening of the year.

Barb Wire.

The New York market presents no new features, prices remaining as before, for Four-Point Galvanized, carload lots, 3.6 cents; 3-ton lots, 3.7 cents, and smaller lots 3.9 cents, with deliveries within the territory covered by the agreement of the manufacturers. The demand is small.

Cut Nails.

The New York market is quiet, at \$1.80 @ \$1.90 for carload lots, on dock, and \$1.90 @ \$2 for small lots, from store. Nothing of general interest was done at the meeting of the Eastern Nail makers, in this city last week.

Miscellaneous Prices.

The annual meeting of the Norway Iron Carriage and Tire Bolt Association was held on the 11th inst. No change in prices was made. The following are the officers of the association: R. P. Cowles, New Haven, Conn., president; C. E. Collins, Cleveland, Ohio, vice-president; F. L. Cowles, secretary and commissioner, and William C. Lanman, Norwich, Conn., treasurer.

Advices from Chicago are to the effect that rumors are current of dissensions among Wire Nail manufacturers, and it is thought by some that lower prices may be made.

At a recent meeting held by the Common Carriage Bolt Association the former discounts and rebates were re-affirmed. It is not intimated that any change in prices will be made for the present.

Since our last report there have been several advances in the Cordage market, as a result of which prices are on both Manila and Sisal Rope 1 cent per pound higher. On the 11th inst. Manila Rope was advanced $\frac{1}{2}$ cent, and was followed by Sisal on the 13th with the same advance, and on the 17th both Manila and Sisal were also advanced another $\frac{1}{2}$ cent per pound. The present prices for large lots are as follows, subject to a discount of $1\frac{1}{2}$ per cent. for cash in 10 days:

Manila, $\frac{1}{2}$ inch and larger.....	cents per lb	13 $\frac{1}{2}$
Manila, $\frac{3}{4}$ inch.....	"	14 $\frac{1}{2}$
Manila, $\frac{1}{2}$ and 5-16 inch.....	"	14 $\frac{1}{2}$
Manila Tarred Rope.....	"	13 $\frac{1}{2}$
Manila Hay Rope.....	"	13 $\frac{1}{2}$
Sisal, $\frac{1}{2}$ inch and larger.....	"	11 $\frac{1}{2}$
Sisal, $\frac{3}{4}$ inch.....	"	12 $\frac{1}{2}$
Sisal, $\frac{1}{2}$ and 5-16 inch.....	"	12 $\frac{1}{2}$
Sisal Hay Rope.....	"	11 $\frac{1}{2}$
Sisal Tarred Rope.....	"	11 $\frac{1}{2}$
Sisal Medium Lath Yarn.....	"	10 $\frac{1}{2}$

The market is still firm and strong, and it is thought that prices may go still higher, as there is a marked scarcity of Hemp, preventing several of the factories from running. In these circumstances manufacturers are not desirous of securing orders.

The Syracuse Hardware Company, Syracuse, N. Y., manufacture the Barry Hanger, of which a very full description, with all requisite illustrations, is given in their circular relating to it. This Hanger is listed at \$6, subject to a discount of 40 and 10 per cent.

A. W. Bishop, Berea, Ohio, issues a neat catalogue devoted to Animal Pokes, in which descriptions are given of the I X L, O K, Pioneer and America. His Buckeye Sash Lock is also represented, and Wyman

Brother & Co.'s Oak Stave Bushel Baskets. This latter house have recently built and equipped an extensive factory for the manufacture of these baskets, which will be brought generally to the attention of the jobbing trade. In regard to Animal Pokes, Mr. Bishop advises us that there is an increasing demand, and refers to the advantages possessed by him from his location in a well-timbered country. The following are his prices, f.o.b. Berea, Ohio:

I X L Poke.....	\$6.50
O K.....	5.50
Pioneer.....	3.75
American.....	3.00

The Braddock Wire Company, Rankin, Pa., intimate that on or about January 1 they will issue a circular giving special prices on genuine Glidden Barb Wire in carload lots, f.o.b. Chicago.

The following are the prices of the Nickel-Plated Steel Nut Cracks and Picks for which the Alford & Berkele Company, 77 Chambers street, New York, are special agents, the list prices given being subject to a discount of 40 per cent.:

In metal plush-lined cases: Half dozen Nut Picks.....	\$0.75
In metal plush-lined cases: Half dozen Nut Picks and one Nut Crack.....	1.50
In leatherette case: One dozen Nut Picks.....	1.50
In leatherette case: One dozen Nut Picks and two Nut Cracks.....	3.00
In plush case: Half dozen Nut Picks and one Nut Crack.....	3.00
Nut Cracks in paper boxes, per dozen....	9.00

Items.

White Mountain Freezer Company, Nashua, N. H., for whom W. H. Quinn & Co., 99 Chambers st., New York, are agents, announce that they have improved in several respects their White Mountain Freezer for 1889, and, among the more important improvements, they mention a complete covering of the gearing, for the purpose of preventing anything from getting between the gears when the Freezer is in use. The company have recently issued a circular calling attention to a new Freezer they are putting on the market, called the Arctic, which they refer to as an exceptionally desirable low priced Freezer. The company have also branch offices at 113 Broad street, Boston, Mass., and 14 West German street, Baltimore, Md.

Union Metallic Cartridge Company, Bridgeport, Conn., announce that they have decided to load their Paper Shells, for doing which they use the most approved machinery and methods, and call special attention to the quality of the material, the powder used being referred to as made expressly for the purpose and giving the best results. They issue a circular giving a price list of the standard loads, describing 38 combinations, which will meet general requirements.

Taunton Tack Company, Taunton, Mass., for whom J. P. Dabney, 239 and 241 Lake street, Chicago, Ill., is agent, have recently added to their enlarged assortment of goods in that city a full line of Wire Carpet Tacks, for which they report a large demand.

E. C. Meacham Arms Company, St. Louis, Mo., have issued their price current No. 394, which bears date December 8. It is not as large as some of their issues, but represents a line of Arms in which Breech-Loading Shotguns have a prominent place. It has also a key to the quotations, which are made in cipher.

Pope Mfg. Company, Boston, Mass., are issuing the Columbia Calendar for 1889. This is intended for desk use and is in the form of a pad of 365 leaves, one for each day of the year. The pad rests upon a portable stand, and when placed upon the desk can easily be used, or used for making memoranda, for which blank space is provided. Each page contains quotations

relating to bicycling and type-writing, the Calendar thus calling attention to the Cycles made by the company and also to the new Becker Type-writer, which they are putting on the market. The extracts are very readable, and serve their purpose well. The Calendar will be appreciated by those who receive it.

Fulton Iron and Engine Works, Detroit, Mich., have issued a new edition of their catalogue, which relates to the Detroit Tools, including Combined Anvils and Vises, Tire Upsetters, Tire Benders, Iron Sheaves, Hand Punches, Fire-Pots, Ventilators, &c. The pamphlet is very neatly printed and gives excellent illustrations of the different Tools. It shows, also, those that have been added since the issue of their former catalogue.

The growth, enterprise and advantages of Montana are exhibited in a handsome pamphlet entitled "The Resources, Business and Business Men of Montana," in which a number of illustrations are given and sketches of prominent business concerns. Among the houses in Helena the A. M. Holter Hardware Company is alluded to as the leading establishment of its kind in Montana, and a sketch is given of its history, with a reference to the extent of its business. Among the articles for which it is agent the following are mentioned: Knowles' Steam pumps, Atlas Engines and Boilers, Leffel Water-Wheels, Leschen's Wire Rope, Buffalo Forges and Blowers, Weston's Chain Blocks, Lightning Screw Plates, Canton Steel Works, Jarecki's Pipe-Threading Tools, New York Belting and Packing Company, Sanderson's English Steel, Star Portable Forges, Morrison's Packing, American Flax Packing, Howe Scales, Hoe Saws, Mixer's Saw Gummings, Morley's Lumbering Tools, Atkins' Silver-Steel Saws, McMullen's Woven-Wire Fencing, Champlain Horse Nails, Burden's Horse Shoes, Giant and Judson Powder, Gold and Silver Medal Caps and Mica Roofing. The business of the company during the present year has been very satisfactory. The large proportion of their trade is with the mining companies, who are, they advise us, almost without exception prosperous. The prosperity of the city is also indicated in a sheet recently published by their enterprising Board of Trade.

Pullman Sash Balance Company, Rochester, N. Y., issue a circular in regard to the construction and use of their Sash Balance, which plainly indicates its special features and utility. It will be observed that this Sash Balance is represented in the advertisement of the company on page 72. The circular also gives the price list, which mentions the different sizes of Sash, with prices for Side and Top Balances.

In his announcement, on page 62, F. V. Wooster, 66 Beverly street, Boston, Mass., illustrates his Axe Wedge, and calls attention to the fact that several styles of these goods have been recently put on the market, which he refers to as infringing his patent.

Grand Rapids Refrigerator Company, Grand Rapids, Mich., issue a new catalogue of their Refrigerators and Creameries for the season of 1889. The catalogue, which is elegantly printed, is well arranged, and gives tasty illustrations of the different styles of hardwood Refrigerators put on the market by the company, and also a number of testimonials, some of which are from prominent and widely-known Hardware houses. The opening circular to the trade calls attention to the advantage in the manufacture of hardwood Refrigerators possessed by the company from their location, and also to the completeness of their factory. The point is also emphasized that they sell to only one dealer in a town, thus giving their

agents the advantage of the special features possessed by their goods. They also issue an exceptionally neat leaflet, intended to be used by jobbers who handle their goods. The capacity of the factory, we are advised, is 100 Refrigerators a day, and it has been running steadily during the past summer and fall.

W. D. Wood & Co., Pittsburgh, Pa., announce that on and after January 1, 1889, the style of their firm will be changed to W. Dewees Wood Company with general business offices and works at McKeesport, Pa., and a branch office at 111 Water street, Pittsburgh.

L. A. Weyburn Company, Rockford, Ill., issue circulars relating to the Ideal Swivel Clevis, Mole's Tire Shrinker, Mole's Adjustable Clamp, the Ideal Farm Gate Hinge and specialties, including Plow Shares, Cultivator Shovels, the Ideal Equalizer, &c.

Trade.

From Louisville, Ky., we have the following advices under date December 15:

The general business of Louisville, Ky., for the past week has been very satisfactory. The crowded freight depots show the enormous volume and varied kinds of merchandise and manufacture shipped from this city.

The Hardware trade during the past week has experienced nothing startling, but a good, steady business was maintained; with considerable increase and better feeling prevailing. The order books show an improvement over last week's good trade, with the further aid of advanced prices on some articles. Barbed and plain Wire are still weak, with few sales from mills, but a good trade from store, which will probably be cut short now by cold weather. The jobbers are looking for the promised advance by the mills. Wire Nails are in good demand, and the dealers whose stocks are running low are feeling around for a break among the manufacturers.

Cut Nails have at last responded to the enormous demand, and made one step up. The action of the mills is approved of by the trade, though they were led to believe the advance would be greater. This conservative movement is best suited to the present time of low prices, and can be further pushed up if the trade demands it, which is looked for some time next month.

Exports.

PER BARK SUBRA, DECEMBER 4, 1888, FOR CAPE TOWN, SOUTH AFRICA.

By H. W. Peabody & Co.—9466 pounds Sisal Rope, 30 dozen Handles, 8 cases Edge Tools, 12 cases Axle Grease.

By Coombs, Crosby & Eddy.—1 pkg. Clothes Pins, 1 case Tinware, 30 dozen Axle Grease.

PER SHIP STEINORA, DECEMBER 7, 1888, FOR BRISBANE, AUSTRALIA.

By Meriden Britannia Co.—4 boxes Plated-ware.

By F. B. Wheeler & Co.—5 dozen Axes, 1 dozen Mattocks, 4½ dozen Saws, 1½ dozen Meat Choppers, 260 dozen Handles, 94 pounds Castings, 1 case Hardware.

By Coombs, Crosby & Eddy.—9 gross Hardware, 20 dozen Tools, 3 dozen Handles, 19 dozen Hardware, 18 gross Tools, 6 dozen Handles, 4 dozen Hardware, 6 dozen Tools, 25 Stoves.

By H. W. Peabody & Co.—68 cases Sewing Machines, 185 packages Hardware, 4,500 pounds Nails, 18 cases Saws, 458 dozen Handles, 39 packages Lampware, 10,000 Cartridges, 68 packages Stoves, 75 packages Carriage-Ware, 23 packages Agricultural Implements, 6 cases Railway Supplies, 47 packages Windmills, 14 cases Axes, 7 packages Hardware, 18 packages Pumps, 6 crates Railway Supplies, 168 packages Hardware, 14 cases Axes, 111 cases Agricultural Implements, 36 dozen Handles, 48 sets Axes, 18 packages Farm Machinery, 92 packages Carriage-Ware, 72 crates Stoves, 3 cases Pumps, 20 crates Blacking, 15 packages Drills, 12 cases Carriages, 15 gross Blacking, 12 cases Tools, 6 cases Edge Tools, 1 case Springs, 3 cases Farm Machinery, 9 packages Carriages and Parts, 9 cases Hardware, 6700 pounds Bolts, 9 Axes, 9 packages Carriage-Ware, 3 packages Lampware, 10 cases Tools, 150 dozen Handles, 3 cases Hardware, 44,800 pounds Barb Wire, 1 case Saws, 10 gross Blacking, 379 dozen Handles, 1 gross Grease, 9 packages Lampware, 13 packages Hardware, 470 dozen Handles, 2 cases Firearms, 1 case Wood-Working Machinery, 56 cases Lawn Mowers, 3 packages Hardware, 2 packages Lampware, 1 package Hardware, 7

cases Hardware, 38 packages Wood-Working Machinery, 5 packages Carriage-Ware.

TO TOWNSVILLE.

18 dozen Handles, 20 packages Hardware, 1 case Firearms, 44,800 pounds Barb Wire, 5 gross Blacking, 534 dozen Handles, 5 gross Shade Rollers, 560 pounds Grease, 9 packages Agricultural Implements, 600 feet Hose, 70 packages Stoves, 67 packages Lampware, 4 rolls Wire Cloth, 2 cases Firearms, 91 packages Tools, 65 packages Hardware, 3 packages Pumps.

PER BARK ESSEX, DECEMBER 7, 1888, FOR BRISBANE, AUSTRALIA.

By Richmond Cedar Works.—950 pounds Wooden-Ware.

By Arkell & Douglass.—½ dozen Windmills and Parts.

By D. C. Pratt.—244 dozen School Slates.

By Collins Company.—122 dozen Tools, 123 dozen Tools.

By Reed & Barton.—1 cask Plated-Ware.

By L. Gershel & Bro.—29½ dozen Plated-Ware.

By Winchester Repeating Arms Co.—20,000 Metallic Cartridges.

By Healy & Earl.—1 crate Forges.

By Manhattan Brass Company.—5 cases Lampware.

By H. W. Peabody & Co.—22,400 pounds Barb Wire.

By Tower Mfg. Co.—6 dozen Hardware, 5 cases Chalk, 60 cases Slates.

By Lazarus & Rosenfeld.—3 dozen Lamps, 1 gross Fly Traps, 50 dozen Washboards, 50 boxes Clothes Pins, 31 dozen Forks, 2 cases Guns, 140 dozen Handles.

By R. W. Cameron & Co.—1 box Machinery, 14 dozen Picks, 11 dozen Handled Axes, 12 Stoves, 4 cases Axes, 4 cases Carriage Material, 8 cases Axes, 3 cases Carriage Springs.

By V. Basanta.—20 dozen Handles, 80 dozen Hatchets, 15 dozen Saws, 18 dozen Thermometers, 4 gross Blacking, 1 gross Whips, 12½ gross Chimneys, 2½ gross Toy Goods, 10 Velocipedes, 2 dozen Money Drawers, 6 dozen Traps, 6 dozen Braces, 17 dozen Lamp Goods, 4 sets Harness, 5 dozen Clippers, 1 dozen Clocks, ½ dozen Pistols, 6 dozen Snaths, 7 dozen Braces, 18 dozen Strops, 60 dozen Lamp Goods, 100 gross Lamp Wicks, 44 dozen Lamp Goods, 15 gross Lamp Wicks, 3650 pounds Carriage Bolts, 1000 Broom Handles.

By R. W. Forbes & Son.—105 dozen Axes, 12 dozen Hammers, 9 dozen Forks, 476 dozen Handles, 13 racks Churns, 20 dozen Snaths, 15 gross Shade Rollers, 1 case Lampware, 45 dozen Axes, 13 crates Stoves, 15 cases Hardware, 6 dozen Axle Grease, 1 case Traps, 2 gross Shade Rollers, 1 case Razor Strops, 1 crate Sad Irons, 11 dozen Axes, 1 dozen Snaths, 2 cases Cages, 31 cases Hardware, 26 dozen Axes, 10 bundles Washboards, 54 dozen Handles, 2 cases Lampware, 1 case Toys, 67 dozen Hatchets, 6 cases Hardware, 38 cases Hardware, 246 dozen Tool Handles, 24 crates Stoves, 2 packages Lampware, 2 cases Bent Screws, 1 case Stencils, 40 dozen Axes, 28 packages Carriage-Ware, 6 dozen Forks, 30 sets Axes, 10 dozen Axes, 1000 Handles, 96 pounds Sash Cord, 2 cases Scales, 1 case Traps, 1 cask Pumps, 1 case Egg Beaters, 4 cases Lanterns, 630 pounds Tire Bolts, 4 packages Kitchen-Ware, 6 dozen Curry Combs, 6 cases Scales, 7 boxes Lawn Mowers, 1 case Toys, 1000 Handles, 1 case Store Trucks, 20 packages Wooden-Ware, 955 pounds Carriage Bolts, 8 dozen Hammers, 1 dozen Ladders, 20 dozen Axes, 2 gross Shade Rollers, 3 cases Oil Stones, 20 gross Blacking, 1 box Cultivators, 12 crates Stoves, 13 dozen Axes, ½ dozen Meat Choppers, 10 packages Hardware, 1 case Hay Knives, 1 rack Churns, 1 dozen Corn Shellers, 4 packages Lampware, 11 cases Hardware, 25 dozen Axes, 14 cases Saws, 11 cases Hardware, 6 gross Shade Rollers, 21 crates Stoves, 2 dozen Wringers, 5 dozen Snaths, 1 dozen Hay Knives, 19 dozen Saws, 28 packages Carriage-Ware, 20 packages Carriage-Ware, 18 packages Carriage-Ware, 2500 pounds Iron Castings, 4 dozen Hatchets, 6 gross Shade Rollers, 2 racks Churns, 27 crates Stoves, 9 packages Hardware, 28 cases Axe Handles, 6 cases Scales, 16 dozen Axes, 30 dozen Axle Grease, 5 dozen Forks, 1 gross Shade Rollers, 52 dozen Axes, 1 case Plated-Ware, 725 Tire Bolts, 4 dozen Curry Combs, 1 case Firearms, 4 cases Hardware, 14 cases Hardware, 13 packages Hardware, 78 packages Carriage Woodwork, 156 dozen Axle Clips, 8 packages Plows and Parts, 2 cases Axes, 9 cases Shade Rollers, 4 packages Wagons, 14 packages Wagons, 300 pairs Roller Skates.

PER SHIP CREEDMORE, DECEMBER 8, 1888, FOR MELBOURNE, AUSTRALIA.

By Waterbury Clock Co.—16 cases Clocks, 7 cases Clocks.

By American Trading Co.—50 boxes Clocks.

By Leaycraft & Co.—28,800 pieces Roofing Slate.

By Lazarus & Rosenfeld.—6 dozen Skates, 2 gross Pencils, 36 cases Skates.

By Singer Mfg. Co.—2094 cases Sewing Machines.

By Healy & Earl.—102 dozen Axes.

By Welsh & Lea.—2 casks Pumps, 9 cases Wringers, 5 boxes Nails, 2 cases Hardware, 1 barrel Hardware.

By Arkell & Douglass.—35 kegs Nails, 25 kegs Nails, 15 sets Hubs, 28 dozen Forgings.

By Woodhouse & Stertz.—13 dozen Axes, 1 case Saws, 1 case Hardware.

By Arnold, Cheney & Co.—10 cases Perambulators, 1 case Spokes.

By A. Field & Co.—50 sets Axes, 39 sets Springs, 30 sets Axes.

By McLean Bros. & Rigg.—25 dozen Planes, 36 dozen Cow Bells, 1 Miter Box, 4 dozen Drawing Knives.

By W. H. Crossman & Bro.—82 dozen Handles, 10 dozen Wash Boards, 2 cases Tools, 10,000 Fuses, 1200 dozen Handles, 1 case Hardware, 2 reams Sand Paper, 6 packages Hardware, 6 cases Hardware, 2591 lbs. Grease.

By R. W. Forbes & Son.—5 packages Hardware, 14,000 Bolts, 26 packages Hardware, 2 packages Hardware, 36 dozen Chisel Handles, 30 packages Lampware, 11 cases Wringers, 30 gross Pencils, 11 dozen Saws, 3 cases Kitchenware, 2 cases Hardware, 24 dozen Handles, 20 dozen Brooms, 2 cases Kitchenware, 1 dozen Swings, 11 dozen Locks, 19 packages Hardware, 4 cases Firearms, 18 crates Stoves, 28 dozen Axes and Hatchets, 2 cases Scales, 3 cases Kitchenware, 11 cases Wringers, 16 cases Kitchenware, 1 case Cages, 500 pairs Skates, 34 dozen Perambulators, 20 gross Glass Cutters, 4 dozen Velocipedes, 200 cases Slates, 100 gross Pencils, 1 case Toys, 2 cases Toys, 10,000 Cartridges, 15 packages Hardware, 2 gross Shade Rollers.

By McLean Bros. & Rigg.—6 gross Glue, 1 dozen Axes, 2500 Broom Handles.

By Crane & McMahon.—20 crates Whiffletrees, 7 crates Whiffletrees, 71 packages Carriage Material, 6 cases Carriage Material.

By Mailer & Quereau.—27,000 pieces Roofing Slate, 5 packages Machinery, 1200 dozen Handles, 400 dozen Handles, 70 dozen Handles, 2 cases Pins, 20 dozen Handles, 6000 pounds Nails, 1 case Brushes, 1 case Saws, 8 cases Velocipedes.

By W. H. Crossman & Bro.—10 dozen Wringers, 3 dozen Revolvers, 12 dozen Curry Combs, 1 cask Pumps, 2 dozen Velocipedes, 10 dozen Forks, 70 dozen Whip Stocks, 8 dozen Wrenches, 264 dozen Handles, 1 dozen Churns, 24 dozen Traps, 10 dozen Horse Brushes, ½ dozen Scales, 3 dozen Meat Choppers, 45 dozen Spading Forks, 2 dozen Hoes, 78 dozen Axes, 3 dozen Bush Hooks, 18 dozen Hatchets, 9 cases Hardware, 4 cases Tools, ½ dozen Chucks, 1½ dozen Saws, 54 dozen Hammers, 55 dozen Traps, 1 case Hardware, 30 dozen Cow Bells, 3 packages Tools, 1 package Hardware, 4 cases Lamp Goods, 30 pounds Tacks, 5 cases Slates, 28 dozen Mouse Traps, 3 cases Hardware.

By R. W. Forbes & Son.—50 dozen Washboards, 1 case Saddlery, 1 case Clocks, 8 packages Hardware, 1 case Pumps, 4 packages Hardware, 1 gross Grease, 1 cask Lampware, 1 case Hardware, 2½ dozen Perambulators, 1 case Plows and Parts, 560 dozen Axes.

Business Methods.

From a New Jersey Hardwareman we have received a letter criticising the forms for making remittances which we have recently published. It is, however, to be borne in mind in reading our correspondent's suggestions that the extent and character of the business transacted has much to do with the desirability of any given method, as one which is suited to certain circumstances would be quite unsatisfactory in others. But we take pleasure in laying before our readers the substance of our correspondent's letter:

Our idea of these things and our way of doing are as follows: First, all the creditor cares about is to have his money and have it promptly paid. Second, all that the debtor should care about is to have a simple acknowledgement or receipt. Nearly every concern with whom we deal sends us a monthly statement. About the 15th or 20th of each month we take these statements, check them by our books, make corrections and deduct allowances. Then we write on bottom of statement, in pencil, three words, "Please return receipted," enclose with statement check for net amount and mail to the creditor, and that's all there is to it. This is simple, economical and to the point, and

so far as these essentials are concerned we'll bet an election hat that none of your readers can produce anything to beat it.

Tendencies in Trade.

We have given in previous issues a number of letters most of which were written by merchants in different parts of the country, in which our correspondents discuss the question as to the position of the Jobber in the distribution of Hardware, and the advantages and disadvantages attending direct dealings between the retailers and the manufacturers. Most of these letters have indicated an appreciation of the important place occupied by the jobbing houses, and the efficient manner in which they serve the convenience of the trade, especially those whose purchases are not of sufficient volume to justify ordering direct from the manufacturers. The enterprise of the jobbing houses, and the fact that merchants can often purchase from them at prices at least as low as those obtainable from the manufacturer have also been duly recognized. On the question as to whether the jobbing business is on the increase there has not been entire agreement, the changes in its character, its decadence in its former strongholds and its development in new fields, making the determining of its precise status a somewhat complicated matter. The disposition shown by many manufacturers to seek their customers mainly among the wholesale trade has also an important bearing on the question; but, on the other hand, it is well known that there are many manufacturers whose policy is to market their goods principally among the retail trade.

Most of the letters which we have published on this question have been from merchants, but that the situation may be seen as regarded from the manufacturers' point of view, we give the following extracts from letters from manufacturers, in which this matter is touched upon in some of its phases. The extracts are given without other indication as to the identity of our correspondents than the State in which they are located:

Connecticut.—We think there is a tendency (and quite strong, too) on the part of Hardware merchants in many lines of goods to buy direct from the manufacturer rather than from the jobber, especially in those lines which are sold very close to cost.

Rhode Island.—In the case of our business there is not an increased tendency on the part of retail merchants to buy direct from us rather than from the jobbers. There are a good many kinds of our goods made and most of the retailers are obliged to sell some of each; therefore they go to a jobber for them, because if they do not want to buy more than one-half or one-quarter dozen they can get them right from the jobber with other goods at a less cost than if they purchased that quantity direct from the factory at a separate shipment. To illustrate this: I was in Boston the other day, and while in a wholesale house there talking to one of the firm a retail Hardware merchant came in and left an order, which contained an order for our line of goods, and in that order, which was only for one dozen all told, he specified three different makes. He gets them from the jobber in one shipment with other goods, whereas if he had gone to the manufacturers he would have had three small shipments.

Illinois.—In regard to the direct trade with retail dealers we avoid it as much as possible. We think that the increased price received over what we charge the jobbing trade is more than consumed by the bother in collecting from a great many country dealers, the extra expense of shipments, cartage, bookkeeping, &c., so that we prefer selling all our goods through the jobbing trade, unless sometimes we get orders from localities where

we have no job agent. This exception is rapidly, however, being overcome by the establishment of agencies in nearly every large city in the United States.

Connecticut.—I am pleased with the results of my Chicago agency, sales increasing every month and also sales to jobbers, while direct sales to retailers decrease very perceptibly. This is the case with Western trade. In Eastern sales to retailers I see no change from year to year.

Indiana.—The line of — is a limited one and they are not bought by the retail trade in large enough quantities to make it pay them to purchase direct of the manufacturers; consequently our trade is wholly with the jobbers. We, however, notice that in other larger lines manufacturers are establishing warehouses in certain Western cities, and we have an idea that their object in doing so is to get nearer the retail trade and to be better able to supply them.

Illinois.—We think undoubtedly the tendency of the Hardware merchant is to purchase direct from the manufacturers. We have observed this ever since we have been in business. The tendency seems to increase rather than decrease. The same may be said of manufacturers as well as merchants. The tendency is for manufacturers to trade with manufacturers, and to ignore the merchants. This seems to be the law of trade, and while we, as merchants, have endeavored to circumvent both the merchants and manufacturers, the fact remains that we have not been able to do it. To protect ourselves we have been forced to become manufacturers, and every year we find ourselves increasing the manufacturing department, striving in this way to hold our trade. We do not find that manufacturers buy less of us on this account, but we think they are more inclined to buy of us, as they feel sure that we are headquarters on any goods we offer. The trade in Chicago is being more largely done to-day by the direct representatives of Eastern factories than ever before, and it looks as though the jobbers, if they wish to continue in business, would have to do as the New York jobbers have done, become manufacturers. The Chicago jobbers have the enterprise, the intelligence and the means to do this, and when they find it necessary this is undoubtedly what they will do, for they are here to stay and supply the market.

New Jersey.—We notice a decided growth in the tendency of small dealers to buy direct from first hands, or, at least, a desire to do so. We think this increased tendency to buy direct is owing to the fact (at least as far as our line of goods is concerned) that the jobber does not carry the amount of stock that he formerly did; in these days the manufacturer has almost the whole load to carry, the jobber simply buying to fill orders, being, in fact, a sales agent only. On the other hand, the fierce competition among manufacturers and the fear of being "left" is compelling them to go to the small trade. This solicitation, together with the knowledge that the jobber carries little or no stock on hand to supply a quick order, gives the small dealer one of the few happy moments of his life—buying a few dollar's worth of goods of the manufacturer without the intervention of the jobber. Although we have always considered manufacturing and distributing to consumers as being two distinct branches, it now looks as though the question of competition would eventually bring the manufacturer and the small dealers into closer relations.

Pennsylvania.—We have so far chiefly disposed of our goods through the jobbing trade, considering it for our purpose more convenient and less expensive than soliciting orders direct from the retailers. Hence, our experience as regards the tendency of the latter to purchase direct from the manufacturers is very limited. If we were manufacturing as large a line of goods as some manufacturers do we should probably attempt to sell direct to the retail trade, and have no doubt that we

could make it to their interest to have them encourage us in doing so; but, with the comparatively few articles we make, we could not not expect to do much trade direct or receive encouragement from the retail trade to solicit orders for them.

Indiana.—We think we see a tendency each year for the larger dealers to purchase their leading goods direct from the manufacturer, and there is hardly a city of any size in the West but that purchases a large portion of its goods direct. On the other hand, there is a large number of dealers in the interior who do a smaller business and buy from the jobbers, and probably as many goods are sold by the jobbers, if not more, than heretofore, on account of the large number of these small dealers that are in business, while the larger dealers in the larger towns or cities have largely increased their trade and capital. We do a large trade with the dealers, and find it a very satisfactory part of our business.

Boston, Mass.—We do not think there is an increased tendency upon the part of retail hardware merchants to purchase direct from manufacturers, because they have always been inclined to do that as much as possible. We do not think it good policy on the part of the manufacturers to encourage this trade, and a great many of them look at it in this light. They find that they are obliged to carry more stock than when they sold simply to the jobbing trade, and the retail merchant is very quick to obtain the extreme prices, thus forcing the manufacturer, in reality, to do a jobbing business at manufacturers' prices. We think that while the hardware merchant is still trying to buy direct the manufacturers are protecting the jobbers to a larger extent than formerly. You will realize that this is our personal experience, and as we are both young men it would not have much weight in comparison with older heads.

Kentucky.—We have noticed a growing tendency on the part of the Hardware merchants to purchase direct of the manufacturers, which we attribute largely to the numerous small manufacturers who are constantly springing up, and who seek this class of trade, as well as consumers themselves, as an outlet for their product. Mills of established reputation endeavor to confine their sales to the jobbing trade.

Ohio.—The jobber, in my case as in many others, is almost a necessity. I will have no agency in Chicago or elsewhere hereafter, but will transact the whole of the business from this city.

Michigan.—The writer was for about 13 years engaged in the Hardware business and begs to say that while some dealers desire to buy of the manufacturer, it is principally confined to the large or first houses. We do not think that the time will ever come when there is no more use for the jobbing Hardware houses.

New York.—In our experience it would appear that the tendency of Hardware merchants to buy direct from the manufacturers is on the increase every year. In fact, a retailer is often considered behind the times or lacking in enterprise if he goes to the jobber for his wares. We refer, of course, to the best city retail trade; the country merchant generally buys less than a manufacturer would care to make a shipment of. The reason for this tendency, in our opinion, is that the jobber looks more for a low price in buying than he does for a good, or even sometimes a fair, article. The city dealer must have good goods to make and retain customers, and he cannot always purchase the quality he wants except of certain manufacturers, who may be unable to deal with a jobber for handling their better goods. There are many reasons why it would be preferable to deal with the wholesale trade and allow them to look after the rest. It saves much labor of detail and the collection of accounts is generally more satisfactory, not to mention the advantage of the concentration of

efforts on one house and on one large order, instead of a great many houses who require only a few goods each. It is well understood by manufacturers of well-made goods that it is only occasionally that a jobber will recognize it to be of importance to have in stock a line of goods that will please his trade in a lasting way. It is generally a question either of forcing the maker of the good article down in price to that of some one else who turns out perhaps wretchedly inferior goods or else of buying w. i. goods at a few cents less, thus necessitating the sale of the other quality at the retail stores. This also tends to degenerate the standard that many manufacturers wish to maintain, as they are apt to become discouraged upon observing how readily worthless goods sell, and how little appreciation is shown of really meritorious goods; and it is quite often that one who starts out with the determination to make only good goods to sell at as low a figure as possible is forced to take a lower price than he can afford, or curtail in quality. If the jobbers would open their eyes to this state of things there would be a much better and more healthy condition of business as the outcome, and the margins would be greater at a higher price paid the manufacturer if the same rate for a profit were added.

Massachusetts.—We are increasing our trade very largely in the West, principally among the jobbers. We ship the larger retail trade to some extent, although it is necessary for them to anticipate their wants somewhat on account of the "go-as-you-please" style of the railroad companies in relation to the freight transportation.

Connecticut.—Our experience among the Hardware merchants is this: That the large jobbing-houses are growing less and the trade (small jobbers and retailers) are purchasing more direct from the manufacturers.

New York.—Our sales are largely to the jobbers, from the fact that comparatively few retailers carry our goods in stock. Our observation is, however, that it is sort of "bred in the bone" to go to the manufacturers direct where possible, and it seems to be easier to do so to-day than ever before. We have been surprised to note the selfishness on part of some jobbers who do not seem willing that a manufacturer's agent should have any commission, because they "wanted the world," and then, again, the same spirit crops out of retailers, who want one-sixth dozen at same price as by gross, and who, after deducting freight and 2 per cent., write out a check on some four-cornered bank for a mere pittance. This is a queer age.

New Jersey.—There is always more or less tendency on the part of country Hardware merchants to seek quotations from manufacturers, thinking in this way to save part, at least, of the jobber's profit. We have not been struck with an increase of this tendency of late, but now that you draw our attention to it, we think it has been more marked than formerly.

Massachusetts.—We do not think there is an increased tendency on the part of the retail Hardware merchants to purchase direct from the manufacturers, but rather from the jobbers.

Connecticut.—We notice an increased tendency on the part of Hardware dealers to order direct from the manufacturers, and to order in small quantities to supply immediate wants, thereby obliging the manufacturers to carry the stock.

New York.—Our product being patented specialties, and being of the opinion that the vast territory included in our country cannot be thoroughly covered through any other agency than the jobbing trade, we seldom make sales to retailers.

Massachusetts.—We observe an increased tendency on the part of Hardwaremen to purchase direct rather than from the jobbers. If this is continued, we think it will be to the advantage of both the Hardwareman and the manufacturers, as it will result in better prices for both.

New York.—We have observed an increased tendency on the part of Hardware merchants to buy direct from manufacturers, as we sell only at present about one-eighth of our goods to jobbers, the rest being sold direct.

Ohio.—As the jobbers buy our goods in carload lots, the saving in freight, as between that quantity and the lesser quantity that the retailer would buy, is very large; and, in addition to this, there is a large difference in our price as between the jobber and the retailer.

Indiana.—We have very little trade with the retail Hardware merchants throughout the country. Our trade is mostly with the manufacturers and Hardware jobbing houses. We have never catered to the retail trade, and prefer to distribute our goods as above indicated.

Connecticut.—We have always noticed a tendency toward direct dealings, and of course the reason is obvious. Every one who sells goods at all wishes to be considered as a jobber, and wants jobbers' prices and terms. We know of no cure for the malady, and do not know if we can add anything to what has already been said regarding it.

Pennsylvania.—We have for some time past noticed a decided tendency on the part of the small and medium trade to deal direct with the manufacturers, they preferring to do so and pay freight rather than buy from the local jobbers.

Maine.—The tendency on the part of the retailers is to buy as much as possible direct from the manufacturers, as our experience is that the jobbers want a slice each way, or, in other words, the largest slice.

Rhode Island.—We find a very decided tendency on the part of Hardware merchants to buy direct of the manufacturer, and while we, as large manufacturers, have no wish to ignore the large jobbers, and would prefer to do business through them, we feel that it is not always safe to leave our interests in their hands, for smaller manufacturers will go directly to the Hardware merchants and obtain their orders by personal solicitation and quoting even prices with the jobber, or sometimes a trifle less. Our trade with the large jobbers has materially decreased of late years, and increased with the Hardware merchants, particularly those who are large distributors of goods. We think that the line between the Hardware jobbers and merchants is not so distinct as it formerly was, for many of the merchants do more or less of a jobbing business, according to their location. In view of the above we have been forced within the last few years to establish a warehouse in Chicago where we carry a full line of our goods, and from which stock we can quickly supply the immediate wants of our customers. Since we commenced business in 1838 we have noticed a movement in the location of the Hardware jobbing trade that is interesting and suggestive. When we began business the jobbing trade was mostly located in New York and Boston, but it moved to Albany, thence to Buffalo and Cincinnati, thence to Chicago and St. Louis, and now indications are that Kansas City, Minneapolis and St. Paul will ere long be jobbing centers of considerable importance. As the movement of the jobbing trade has been westward many of the Eastern houses have retired from business or become manufacturers' agents. It is worthy of note that during this time Philadelphia has always retained a certain amount of jobbing trade, while Baltimore has remained a city of Hardware commission merchants.

Ohio.—We have no dealings with retail dealers except in our own town. Our experience is that the jobbers do a larger proportion of the business in our goods than they did 10 years ago.

Pennsylvania.—Our sales to the retail trade are less than they were two years ago, while our sales to the jobbing trade are increasing.

Massachusetts.—We have had a great many inquiries from retailers for prices,

and if we did not quote them the price to jobbers they have apparently been provoked and would not give us an order. We have just answered an inquiry from a retail house in San Francisco, and have quoted him price by dozen and also referred him to the jobbers as being the better way to get the goods, and we presume it will be the last he will do about our goods, because we have not given him the price we give the jobber. We have many instances of this sort. Of course we have no objection to selling to the retail trade, provided they are willing to pay the retailers' price, although as a general thing we would rather sell to the jobber. We do our best in making price to divide fair profit between jobber and retailer, and it looks to us as though the retailer should be willing to get his goods of the jobber, paying him a fair margin.

Pennsylvania.—Our trade is very large with the dealers within a radius of 100 or 200 miles, but we find that we receive very few orders from a greater distance, except those from jobbers. We are disposed to think that the jobber is a necessity and cannot be done away with only at a great disadvantage to dealers, who can secure an assortment of goods that would require several different manufacturers to fill at about the same prices that manufacturers sell at to the small trade, thereby making a considerable saving in freight and getting the goods quicker.

Connecticut.—We deal with jobbers and large retailers, and our experience with the retail trade is not as good as that of some other manufacturers. But as far as our information extends, the majority of the retail trade are buying of the jobbers, especially in the West, as they can get at short notice a bill of goods at one house instead of ordering from several manufacturers, and thus save freight. Large retailers are generally ordering from the manufacturers.

Rhode Island.—With regard to increase of retail trade with manufacturer: We think in the East it is very marked in our line of goods, as also the direct trade of consumers with manufacturers.

Connecticut.—Our ——— and other specialties are handled by some of the leading jobbers West, and trade in the above named article is spreading. We find a gradually increasing demand from the retailer, but scarcely know the cause.

The lowest bid on a lot of 5000 tons of steel rails for the German State railroads recently was 116 marks. This is equivalent to \$28.37, so that the German prices are considerably above those in our country.

During the week ending December 15 the Lackawanna Coal and Iron Company, of Scranton, Pa., produced 3499 tons, 13 cwt. of rails, including light rails.

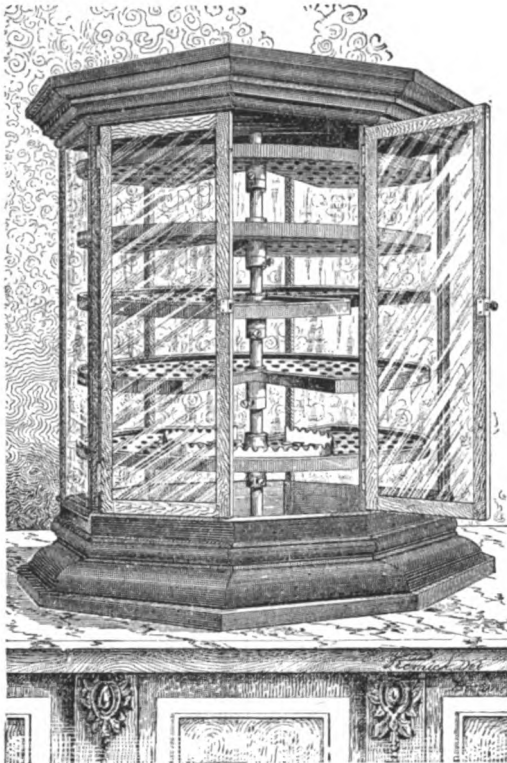
J. & H. Taylor, of 16 St. John street, Montreal, call our attention to an error in the paragraph published on page 900 of *The Iron Age* of December 18, relating to the proposed bridge over the St. Lawrence River, at Coteau. The bridge is to be built by the Canada Atlantic Railway Company, for its traffic between Ottawa and Boston, via the Central Vermont and its connections.

Up to the present time there have been made 9200 tons of open-hearth steel in a single furnace at the Homestead Steel Works of Carnegie, Phipps & Co., Limited, Pittsburgh, and it is expected that a tonnage of not less than 15,000 tons will be got out of this one furnace. There have been no repairs of any kind to it beyond one cleaning of the checker work. The furnace was built with low silica brick made by Isaac Reese, at Manorville, Armstrong County, Pa.

The Lamson Patent Revolving Show Case.

This case, which is illustrated in the accompanying cut, is put on the market by Danforth & Pike, 114 Washington street, Boston, Mass. It is octagonal in shape and referred to as strongly made

inches. It is obvious that the plates can conveniently be placed between the bars and in this position can easily be rinsed, or if desired to use the construction as a plate warmer it can be put in the oven or over the range or register, when the warm air circulating freely between the plates will warm them evenly. This article is



The Lamson Patent Revolving Show Case.

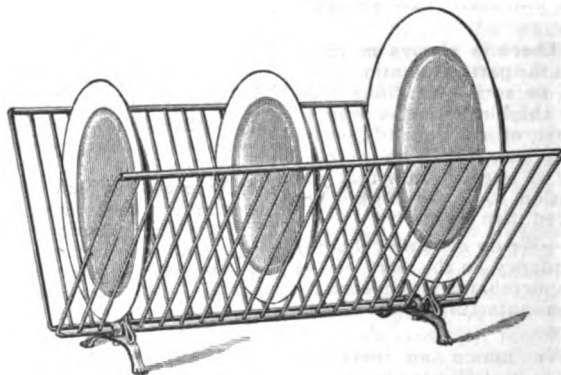
and handsomely finished. The panels are of plate glass and are held in place by deep grooves in the posts, no putty or cement being used. The tops and bottoms are so constructed as to prevent them from warping, swelling or contracting. The shelves, it will be observed, revolve independently of each other on a steel standard in the center, and are adjustable in any desired position. They are made from light gray iron highly japanned, and in the best cases are covered with plush. As will be seen from the cut, one-fourth of each shelf is wanting. This enables one to remove an article without reaching under a shelf, as by simply revolving the shelf until the aperture in the shelf above is over the article wanted it can readily be reached and taken out. These cases are made in three sizes with 14, 18 or 24 inch shelves, and also in different kinds of wood as well as with iron top and bottom. All the cases are so constructed that the parts are interchangeable. The efficiency of the display secured, and the large variety of goods accommodated, are points on which special emphasis is laid.

Folding Dish Drainer and Plate Warmer.

This article is manufactured by Woods, Sherwood & Co., Lowell, Mass., and is represented in the illustration given below. It will be seen that it consists of two movable wire sides, which are so attached to the supports underneath that they can be separated, as shown in the cut, so as to permit the placing of dishes or plates between them, or, if desired, can be folded together, so as to permit the article being put away in a small space. The sides are about 16 inches long and their height 8

well made and finished. Its simplicity and utility are referred to as commending it to the trade.

The investigation by the New York Senate committee relative to alleged extortionate elevator charges, from which the grain traffic on the canals is said to suffer severely, seems to show that the McEvoy bill is practically a dead letter.



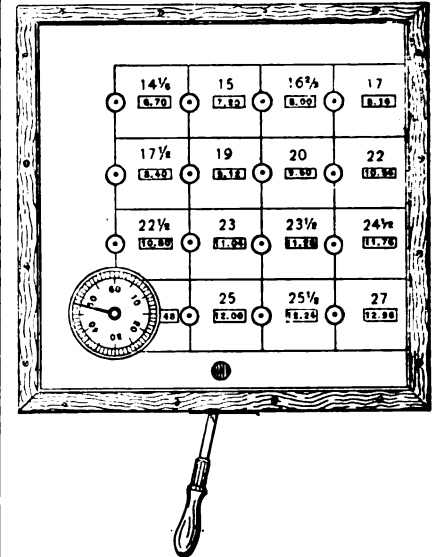
Folding Dish Drainer and Plate Warmer.

The law is evaded by charging for storage for every ten days or fraction thereof. Thus the elevator men get exactly the same rates as before. This schedule of rates was adopted by an agreement of the Elevator Association. There are 40 concerns in it, 27 of which are active. The earnings of the 27 are pooled, and one-third of the amount is set aside to be divided according to their respective shares in the association among the active houses.

The rest is divided in the same way among all the members, "dead houses" included.

Wages Calculator.

The Willis Mfg. Company, of No. 157 Broadway, New York, have introduced to the trade a device for readily computing the wages of workmen, a view of which is shown in the accompanying cut. It consists of a series of paper dials, on which are printed the amounts for different numbers of hours at different rates, so connected by internal mechanism that when an auxiliary dial of hours is turned to any



Wages Calculator.

required number the amount of that number by the different rates per hour will appear in the several openings over the dials first referred to. This will at once be understood by reference to the cut. The engraving shows the mechanism operated by means of a handle with a peculiar crank connection. The device is also manufactured operated by a center button. The sample before us has on one side rates 14 $\frac{1}{4}$, 15, 16 $\frac{1}{4}$, 17, 17 $\frac{1}{2}$, 19, 20, 22, 22 $\frac{1}{2}$, 23, 23 $\frac{1}{2}$, 24 $\frac{1}{2}$, 25, 25 $\frac{1}{2}$ and 27 cents per hour. The opposite side of the device is provided with a corresponding

number of rates, rendering the calculator susceptible of use in an establishment with the widest range of wage prices. The advantage to the bookkeeper or time-clerk in having something of this kind for use in figuring, something which frequently has to be done with no time for revision and proof, will be manifest without lengthy explanation. In addition to calculations of wages the same mechanism may be adapted to various other uses.

CURRENT HARDWARE PRICES.

DECEMBER 19, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Percussion, 7 1000—	
Black & Goldmark's	
F. L. Waterproof, 1-10's	50¢
M. B. Trimmed Edge, 1-10's	55¢
M. B. Ground Edge, Central Fire, 1-10's	70¢
Double Waterproof, 1-10's	51.40
Musket Waterproof, 1-10's	50¢
G. D.	58¢
G. B.	50¢

Union Metallic Cartridge Co.	
F. O. Trimmed	50¢
F. L. Ground	55¢
Con. Fire Groove	70¢
Double Water-proof	51.40
Double Water-proof, in 1-10's	51.40
A. B. Genuine Imported	45¢
Wiley's E. B.	54¢
Wiley's D. Waterproof, Central Fire	51.60

Cartridges—	
Rim Fire Cartridges	dis 50¢ 52¢ 53¢
Rim Fire Military	dis 15¢ 23¢
Central Fire Pistol and Rifle	dis 52¢ 53¢
Central Fire Military and Sporting	dis 15¢ 23¢
Riant Cartridges, except 23 and 32 cal., an additional 10% over above discounts	
Blank Cartridges 23 cal	\$1.75, dis 2%
Blank Cartridges 32 cal	\$3.50, dis 2%
Primed Shells and Bullets	dis 16¢ 52¢
B. B. Caps, Round Ball	\$1.75, dis 2%
B. B. Caps, Conical Ball, Swaged	\$2.00, dis 2%

Primers—	
Berdan Primers all sizes, and E. L. Caps (for	
Sturtevant Shells)	\$1.00, dis 2%
All other Primers, all sizes	\$1.20, dis 2%

Shells—	
First quality, 4, 8, 10 and 12 gauge	dis 25¢ 10¢ 2%
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30¢ 10¢ 2%
Star, Club, Rival and 10 gauge, \$9 list	dis 32%
Climax Brands, 12 gauge, \$8 list	\$10 2%
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢ 10¢ 2%
Seibold's Combination Shot Shells	dis 15¢ 2%
Brass Shot Shells, Club, Rival, Climax	dis 65¢ 2%
A. B. & C. Co., I. X. L., 10 & 12 gauge	dis 40¢ 52¢
A. B. & C. Co., "Special," 16 gauge	dis 30¢ 10¢ 52¢
A. B. & C. Co., "Special," 10 & 12 gauge	dis 40¢ 10¢ 2%
Fowler's Patent, 10 & 12 gauge, \$100	\$3.75

Shells Loaded—	
List No. 19 1887	dis 20 & 10%

Wads—	
U. M. C. & W. R. A.—R. E., 11 up	\$2.00
U. M. C. & W. R. A.—R. E., 9&10	2.30
U. M. C. & W. R. A.—R. E., 7&8	2.60
U. M. C. & W. R. A.—P. E., 11 up	2.10
U. M. C. & W. R. A.—P. E., 9&10	4.00
U. M. C. & W. R. A.—P. E., 7&8	4.90
Wiley's E. B., 11 up	\$1.75
Wiley's P. E., 11 up	\$2.30

Anvils—	
Large Anvils	\$104, dis 20 & 30%
Peter Wright's	94¢
Armstrong's Mouse Hole	84¢
Armstrong's Mouse Hole, Extra	11¢
Frederick	94¢
Wilkinson's	94¢
J. & Bailey Carr. Patent Solid	11¢

Asiatic Vice and Drill—	
Miller's Falls Co.	\$18.00, dis 20%
Chester Anvil and Vice	dis 25%
Allen Combined Anvil and Vice	dis 40&10%
Moore & Barnes Mfg. Co.	dis 33%

Apple Parers.

Advance	dis 4.75
Antrim Combination	dis 5.50
Baldwin	dis 5.25
Champion	dis 7.25
Eureka, 1888	each 17.00
Family Bay State	dis 13.00
Gem	dis 5.25
Gold Medal	dis 4.00
Hudson's New '88	dis 3.75
Ideal	dis 4.75
Improved Bay State	dis 30.00
Little Star	dis 5.00
Monarch	dis 13.50
New Lightning	dis 5.50
Orion	dis 4.00
Penn.	dis 4.00
Perfection	dis 4.00
Pomona	dis 4.00
Rocking Table	dis 6.00
Turntable	dis 4.50
Victor	dis 13.50
Waverly	dis 4.50
White Mountain	dis 4.50
72	dis 4.25
73	dis 5.75
75	dis 6.50

Augers and Bits.

Douglas Mfg. Co.	
Wm. A. Ives & Co.	dis 70%
Humphreysville Mfg. Co.	
French, Swift & Co. (F. H. Beecher)	dis 55%
Cook's, Douglas Mfg. Co.	dis 55%
Cook's, New Haven Copper Co.	dis 50&10%
Ives' Circular Lip	dis 60%
Patent Solid Head	dis 30%
O. E. Jennings & Co., No. 10, extension lip	dis 40%
O. E. Jennings & Co., No. 20	dis 60%
O. E. Jennings & Co., Auger Bits, in fancy boxes	dis 20%
W. sec. 32 1/4, quarter, No. 5, 6; No. 8, 9	dis 45%
Bussell's Patent Single Twist	dis 45%
Bussell's Jennings Augers and Bits	dis 50&10%
Imitation Jennings Bits (new list)	dis 50&10%
Pugh's Black	dis 30%
Our Bits	dis 50&10%
L'Hommedieu Our Bits	dis 15&10%
Forrester Pat. Auger Bits	dis 10%

Blind Augers—

Ives	dis 25&10%
French, Swift & Co.	dis 25&10%
Douglas	dis 25&10%
Bonney's Adjustable	dis 40&10%
Stearns	dis 20&10%
Ives' Expansive, each \$4.50	dis 50&10%
Universal Expansive, each \$4.50	dis 20%
Wood's	dis 25 & 25&10%

Common	dis 25 & 25&10%
Clark's small, 15; large, 300	dis 35 & 40%
Ives' No. 4, per doz. 350	dis 35 & 40%
Swan's	dis 40%
Stearns, No. 1, 200; No. 2, 325	dis 35%
Stearns' No. 4, 545	dis 20%
Double Cut, Ct. Valley Mfg. Co.	dis 30&10%
Double Cut, Hartwell's, \$ gro.	dis 35, 25
Double Cut, Douglas's, \$ gro.	dis 40&10%
Double Cut, Ives'	dis 50 & 60&10%

4th Stock Drills—	
Morse Twist Drills	dis 50&10&10%
Standard	dis 50&10&10%
Cleveland	dis 50&10&10%
Syracuse, for metal	dis 50&10&10%
Syracuse, for wood (wood list)	dis 20 & 30&10%
Williams' or Holt's, for metal	dis 50&10&10%
Williams' or Holt's, for wood	dis 40&10%

Ship Augers and Bits—	
L'Hommedieu's	dis 15&10 & 15&10&10%
Watrous'	dis 15&10 & 15&10&10%
snells	dis 15&10 & 15&10 & 25%
snell's Ship Auger Pat'n Car Bits	dis 15&10 & 15&10&10%

Awl Hafts—	
Swing Bar Ferrule	\$3.50 \$ gro. dis 45&10%
Patent Sewing, Short	\$1.00 \$ gro. dis 40&10%
Patent Sewing, Long	\$1.20 \$ gro. dis 40&10%
Patent Peg, Plain Top	\$1.00 \$ gro. dis 45&10%
Patent Peg, Leather Top	\$1.20 \$ gro. dis 45&10%

Awls, Brad Sets, &c.—	
W. B. Sewing, Common	\$ gro. \$1.70—dis 35%
W. B. Shouldered Peg	\$ gro. \$2.45—dis 40&10&10%
W. B. Patent Peg	\$ gro. \$2.45—dis 40&10&10%
W. B. Shouldered Brad	\$2.70 \$ gro. dis 35%
W. B. Handled Brad	\$7.50 \$ gro. dis 45%
W. B. Handled Scratch	\$7.50 \$ gro. dis 45&10%
W. B. Socket Scratch	\$1.50 \$ gro. dis 35 & 30%

Awl and Tool Sets—	
Allen's Set, Awls & Tools, No. 30	\$10—dis 55&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%

Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%

Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%

Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
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Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
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Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%

Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%

Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%

Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%

Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Miller's Falls Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%
Tray's Ad. Tool Hds., No. 1, 113; 2, 113; 3, 113; 4, 113	dis 25&10%

Blind Fasteners—	
Macrell's	\$ dos pairs, \$1.00—dis 30&10&10%
Van Sand's Screw Pattern	\$15 \$ gro. dis 60&10%
Van Sand's Old Pattern	\$15 \$ gro. dis 55&10%
Washburn's Old Pattern	\$15 \$ gro. dis 55&10%
Washburn's New Pattern	\$15 \$ gro. dis 55&10%
Austin & Eddy, No. 2005	\$15 \$ gro. dis 55&10%
Security Gravit	\$15 \$ gro. dis 55&10%

Blind Staples—	
Barbed, 1/2 in. and larger	\$ 7 1/2 \$ 8 1/2 net
Barbed, 1/4 in.	\$ 8 1/2 \$ 9 1/2 net

Blocks—	
Cleveland Block Co., gal. iron	dis 50%
Novelty Tackle Blocks, gal. iron	dis 50%

Belts—	
Door and Shutter—	
Cast Iron Barrel, Square, &c.	dis 70 & 70&10%
Cast Iron Shutter Bolts	dis 70 & 70&10%
Cast Iron Chain (Sargent's list)	dis 65&10%
Ives' Patent Door Bolts	dis 50%
Wrought Barrel	dis 70 & 70&10%
Wrought Square	dis 70 & 70&10%
Wrt. Shutter, all iron, Stanley's list	dis 40&10%
Wrt. Shutter, Brass Knob, Stanley's	dis 40&10%
Wrought Shutter, Sargent's list	dis 60&10%
Wrought Sunk Flush, Sargent's list	dis 55&10%
Wrought Sunk Flush, Stanley's list	dis 55&10%
Wrought Sunk Flush, Stanley's list	dis 55&10%

Carriage—	
Com. list No. 10, '84	dis 75&10&10%
Genuine Eagle, list Oct. '74	dis 75&10%
Phila. pattern, list Oct. '74	dis 75&10&10%
R. & W. old list	dis 70%

Common, list Feb. 23, 1888	dis 70%
P. C. B. & N. Co., Empire, list Feb. 23, 1888	dis 70%
P. C. B. & N. Co., Philadel., list Oct. '84	dis 83%
P. C. B. & N. Co., Keystone, Phil. list Oct. '84	dis 80%
P. C. B. & N. Co., Norway, Phil. list Oct. '84	dis 75&10%
Am. S. Co., Norway, Phil. list Oct. '84	dis 75&10%
Am. S. Co., Regis, Phil. list Oct. '84	dis 80%
Am. S. Co., Philadel., list Oct. '84	dis 83%
Am. S. Co., Bay State, list Feb. 23, '88	dis 83%
R. & W. Philadel., list Oct. 15, 1884	dis 82%
R. & W. Mfg. Co.	dis 70%

Stove and Plow—	
Stove	dis 62%
Plow	dis 60&10%
Am. S. Co. Stove, Annealed	dis 62%
R. & W. Plow	dis 65%
R. & W. Stove	dis 62%
R. & W. Mfg. Co. Stove	dis 62%

Machine, according to size	dis 75&10 & 80%
Bolt Ends, according to size	dis 75&10 & 80%
Berry	\$ 2 1/2 \$ 10 1/4

Boring Machines—	
Without Augers	dis 50%
Douglas	\$ 4.50
Snell's, Rice's Patent	\$ 5.50
Jennings	\$ 5.50
Other Machines	\$ 2.75
Phillips' Pat. with Augers 7.00	\$ 7.50

Sew Pipe—	
Hudson, Beckley & Co.'s	dis 60&10%
Sargent & Co.'s	dis 60&10%
Peck, Stow & W. Co.	dis 60&10%

Brackets

Wrought (Steel)—	
Fast Joint Narrow	dis 70&10 1/2
Fast Joint, L. Narrow	dis 70&10 1/2
Fast Joint, Bro.	dis 70&10 1/2
Loose Joint, Broad	dis 70&10 1/2
Table Butts, Back Flaps, &c.	dis 70&10 1/2
Inside Blind, Regular	dis 70&10 1/2
Inside Blind, Light	dis 70&10 1/2
Loose Pin	dis 70&10 1/2
Bronzed Wrought Butts	dis 40&10 1/2 @ 40&10 1/2 5/8

California—See Compasses.

Calks, Tee	
Gaulter	dis 54&6 1/2
Dewicks	dis 54&6 1/2
Can Openers	
Messengers—Comet	dis 53.00, dis 25 1/2
American	dis 53.00, dis 25 1/2
Duplex	dis 53.00, dis 25 1/2
Lyman's	dis 53.00, dis 25 1/2
No. 4, French	dis 53.00, dis 25 1/2
No. 5, Iron handle	dis 53.00, dis 25 1/2
Eureka	dis 53.00, dis 25 1/2
Sardine Cutters	dis 53.00, dis 25 1/2
Star	dis 53.00, dis 25 1/2
Supra	dis 53.00, dis 25 1/2
World	dis 53.00, dis 25 1/2
No. 3, 38¢.00	dis 53.00, dis 25 1/2
Universal	dis 53.00, dis 25 1/2
Domestic	dis 53.00, dis 25 1/2
Champion	dis 53.00, dis 25 1/2

Cards	
Horse and Curry	dis 10&10 1/2 @ 10&10 1/2 1/2
Ootton	dis 10&10 1/2 @ 10&10 1/2 1/2
Wool	dis 10&10 1/2 @ 10&10 1/2 1/2

Carpet Stretchers	
Cast Steel, Pollack	dis 52.25
Cast Iron, Steel Points	dis 52.25
Socket	dis 52.25
Bullard's	dis 52.25

Carpet Sweepers	
Bissell No. 5	dis 517.00
Bissell No. 7, New Drop Fan	dis 517.00
Bissell Grand	dis 517.00
Grand Rapids	dis 517.00
Crown Jewel	dis 517.00
Magie	dis 517.00
Jewel	dis 517.00
Improved Parlor Queen, Nickel	dis 517.00
Improved Parlor Queen, Japanned	dis 517.00
Exc. Int.	dis 517.00
Garland	dis 517.00
Parlor Queen	dis 517.00
Housewife's Delight	dis 517.00
Queen	dis 517.00
Queen, with band	dis 517.00
King	dis 517.00
Wood Improved	dis 517.00
Hub	dis 517.00
Conqueror	dis 517.00
Easy	dis 517.00
Monarch	dis 517.00
Goose	dis 517.00
Advance	dis 517.00
Ladies' Friend, No. 1, 7 doz, \$15.00; No. 2	dis 517.00
American	dis 517.00
Grand Republic	dis 517.00

Carriages—See Ammunition.

Carriages	
Bed	dis 55 1/2 @ 55 1/2 5/8
Plate	dis 55 1/2 @ 55 1/2 5/8
Shadow Socket	dis 55 1/2 @ 55 1/2 5/8
Deep Socket	dis 55 1/2 @ 55 1/2 5/8
Yale Casters, list May, 1884	dis 55 1/2 @ 55 1/2 5/8
Yale, Gem	dis 55 1/2 @ 55 1/2 5/8
Martin's Patent (Phoenix)	dis 55 1/2 @ 55 1/2 5/8
Payson's Anti Friction	dis 55 1/2 @ 55 1/2 5/8
"Giant" Truck Casters	dis 55 1/2 @ 55 1/2 5/8
Stationary Truck Casters	dis 55 1/2 @ 55 1/2 5/8

Oattle Leathers

Hudson, Beckley & Co's	dis 50&10 1/2 @ 50&10 1/2 5/8
Bargent's	dis 50&10 1/2 @ 50&10 1/2 5/8
Hochkiss	dis 50&10 1/2 @ 50&10 1/2 5/8
Peck Stow & W. Co.	dis 50&10 1/2 @ 50&10 1/2 5/8

Chain

Trace, 6-10-8, exact sizes, 7 pair, \$1.03	dis 50&10 1/2 @ 50&10 1/2 5/8
Trace, 6-10-8, exact sizes, 7 pair, 94	dis 50&10 1/2 @ 50&10 1/2 5/8
Trace, 7-10-2, exact sizes, 7 pair, 1.11	dis 50&10 1/2 @ 50&10 1/2 5/8
Trace, 7-10-2, exact sizes, 7 pair, 1.11	dis 50&10 1/2 @ 50&10 1/2 5/8
Trace, 7-10-2, exact sizes, 7 pair, 1.11	dis 50&10 1/2 @ 50&10 1/2 5/8

Nortz—Traces, "Regular" sizes 34 net 7 pair less than exact.

Log, Fish, Stretcher, and other rancy Chains, list Nov. 1, 1884	dis 50&10 1/2 @ 50&10 1/2 5/8
American Coil 3-16 1/2	dis 50&10 1/2 @ 50&10 1/2 5/8
In case lots, 6-10-8, 5-10-8, 4-10-8, 3-10-8, 2-10-8	dis 50&10 1/2 @ 50&10 1/2 5/8
Less than case lots, add 1/2¢ per lb.	dis 50&10 1/2 @ 50&10 1/2 5/8
German Coil, list of June 30, 1887	dis 50&10 1/2 @ 50&10 1/2 5/8
Ger. Hailer Coil, list of June 30, 1887	dis 50&10 1/2 @ 50&10 1/2 5/8

Covert Halter, Hitching and Breast

Covert Traces	dis 50&10 1/2 @ 50&10 1/2 5/8
Cresida Hailer Chain	dis 50&10 1/2 @ 50&10 1/2 5/8
Garland's Pump Chain	dis 50&10 1/2 @ 50&10 1/2 5/8
Jack Chain, Iron	dis 50&10 1/2 @ 50&10 1/2 5/8
Jack Chain, Brass	dis 50&10 1/2 @ 50&10 1/2 5/8
Chalk—White	dis 50&10 1/2 @ 50&10 1/2 5/8
Red	dis 50&10 1/2 @ 50&10 1/2 5/8
Blue	dis 50&10 1/2 @ 50&10 1/2 5/8
White Crayons	dis 50&10 1/2 @ 50&10 1/2 5/8

Chalks, Lines—See Lines.

Chisels

Socket Framing and Firmer—	
P. S. & W.	dis 75&10 1/2 @ 75&10 1/2 5/8
New Haven and Middlesex	dis 75&10 1/2 @ 75&10 1/2 5/8
Ohio Tool Co.	dis 75&10 1/2 @ 75&10 1/2 5/8
Buck Bros.	dis 75&10 1/2 @ 75&10 1/2 5/8
Merrill	dis 75&10 1/2 @ 75&10 1/2 5/8
L. & J. White	dis 75&10 1/2 @ 75&10 1/2 5/8
Witherby and Douglass	dis 75&10 1/2 @ 75&10 1/2 5/8
Tanged Firmers	dis 75&10 1/2 @ 75&10 1/2 5/8
Tanged Firmers, Butcher's	dis 75&10 1/2 @ 75&10 1/2 5/8
Tanged Firmers, Spear & Jackson's	dis 75&10 1/2 @ 75&10 1/2 5/8
Tanged Firmers, Buck Bros.	dis 75&10 1/2 @ 75&10 1/2 5/8
Cold Chisels	dis 75&10 1/2 @ 75&10 1/2 5/8
Chisels	dis 75&10 1/2 @ 75&10 1/2 5/8
Beach Patent	dis 75&10 1/2 @ 75&10 1/2 5/8
Morse's Adjustable	dis 75&10 1/2 @ 75&10 1/2 5/8
Danbury	dis 75&10 1/2 @ 75&10 1/2 5/8
Syracuse, Bals Pat.	dis 75&10 1/2 @ 75&10 1/2 5/8
Clamps	dis 75&10 1/2 @ 75&10 1/2 5/8
Providence Tool Co's Wrought Iron	dis 75&10 1/2 @ 75&10 1/2 5/8
Adjustable, Gray's	dis 75&10 1/2 @ 75&10 1/2 5/8
Adjustable, Lambert's	dis 75&10 1/2 @ 75&10 1/2 5/8
Adjustable, Snow's	dis 75&10 1/2 @ 75&10 1/2 5/8
Adjustable, Hammer's	dis 75&10 1/2 @ 75&10 1/2 5/8
Adjustable, Stearns	dis 75&10 1/2 @ 75&10 1/2 5/8
Wearns' Adjustable Cabinet and Corner	dis 75&10 1/2 @ 75&10 1/2 5/8
Cabinet, Bargent's	dis 75&10 1/2 @ 75&10 1/2 5/8
Carriage Makers' Sargent's	dis 75&10 1/2 @ 75&10 1/2 5/8
Edward Mfg. Co.	dis 75&10 1/2 @ 75&10 1/2 5/8
Warner's	dis 75&10 1/2 @ 75&10 1/2 5/8
Saw Clamps	dis 75&10 1/2 @ 75&10 1/2 5/8
Clips	dis 75&10 1/2 @ 75&10 1/2 5/8
Norway, Axle, 1/4 & 5-16	dis 55&6 1/2 @ 55&6 1/2 5/8
Second grade Norway Axle, 1/4 & 5-16	dis 55&6 1/2 @ 55&6 1/2 5/8
Superior Axle Clips	dis 55&6 1/2 @ 55&6 1/2 5/8
Norway Spring Bar Clips, 5-16	dis 55&6 1/2 @ 55&6 1/2 5/8
Wrought-Iron Felloe Clips	dis 55&6 1/2 @ 55&6 1/2 5/8
Steel Felloe Clips	dis 55&6 1/2 @ 55&6 1/2 5/8
Baker Axle Clips	dis 55&6 1/2 @ 55&6 1/2 5/8
Geckeyes	dis 55&6 1/2 @ 55&6 1/2 5/8
Geckeyes, Brass—Hardware list	dis 55&6 1/2 @ 55&6 1/2 5/8

Office Mills	
Box and Side, list revised Jan. 1, 1888	dis 50&2 1/2 @ 50&2 1/2 5/8
American, Enterprise mfg Co.	dis 50&2 1/2 @ 50&2 1/2 5/8
The "Swift" Lane Bros	dis 50&2 1/2 @ 50&2 1/2 5/8
Compasses, Dividers, etc.	
Compasses, Callipers, Dividers	dis 70&70&10 1/2
Semis & Call Co's Dividers	dis 60&6 1/2
Semis & Call Co's Compasses & Callipers	dis 60&6 1/2
Semis & Call Co's Wires & Inside or Outside	dis 60&6 1/2
Semis & Call Co's Donors	dis 60&6 1/2
Semis & Call Co's (Call's Patent Inside)	dis 60&6 1/2
Excelsior	dis 60&6 1/2
I. Stevens & Co's Callipers and Dividers	dis 25&10 1/2 @ 25&10 1/2 5/8
Starrett's Spring Callipers and Dividers	dis 25&10 1/2 @ 25&10 1/2 5/8
Starrett's Lock Callipers and Dividers	dis 25&10 1/2 @ 25&10 1/2 5/8
Starrett's Combination Dividers	dis 25&10 1/2 @ 25&10 1/2 5/8

Coopers' Tools—Bradley's	
Sartons	dis 20&20&2 1/2
C. & L. J. White	dis 20&2 1/2 @ 20&2 1/2 5/8
Liberton Mfg. Co.	dis 25 1/2
Beatty's	dis 40 @ 40&2 1/2
Landusky Tool Co.	dis 80 @ 80&2 1/2
Corkscrews	
Hudson & Beckley Mfg. Co.	dis 40 @ 40&10 1/2
Monroe's Patent	dis 85 1/2 @ 85&2 1/2
Worm & Hubbert	dis 35 1/2
Wadsworth	dis 10 1/2
Bradley's	dis 10 1/2
Cradles—Grain	dis 50&2 1/2
Crow Bars—Cast Steel	dis 25 1/2 @ 25&10 1/2
Iron, Steel Points	dis 25 1/2 @ 25&10 1/2
Curry Combs	dis 50&10 1/2 @ 50&10 1/2 5/8
Rich	dis 50&10 1/2 @ 50&10 1/2 5/8
Rubber	dis 50&10 1/2 @ 50&10 1/2 5/8
Perfect	dis 50&10 1/2 @ 50&10 1/2 5/8
Curtain Pins—Silvered Glass	dis 50&10 1/2 @ 50&10 1/2 5/8
White Enamel	dis 50&10 1/2 @ 50&10 1/2 5/8
Outlier	dis 50&10 1/2 @ 50&10 1/2 5/8
Beaver Falls and Booth's	dis 55 1/2 @ 55&10 1/2
Wostenholme	dis 55 1/2 @ 55&10 1/2

Dampers, etc.	
Dampers	dis 50 1/2
Huffat Dampers Clips	dis 50 1/2
Crown Damper	dis 40 1/2
Excelsior	dis 40&10 1/2

Dog Collars—See Compasses.

Embossed Gift, Pope & Stevens' list	dis 80&10 1/2
Leather, Pope & Stevens' list	dis 40 1/2
Brass, Pope & Stevens' list	dis 40 1/2
Door Springs	
Torrey's Rod, regular size	dis 50 1/2 @ 50&10 1/2
Gray's	dis 50 1/2 @ 50&10 1/2
Ber Rod	dis 50 1/2 @ 50&10 1/2
Warner's No. 1, 7 doz, \$3.50; No. 2, \$3.30	dis 40&10 1/2 @ 40&10 1/2 5/8
Gem Coll, list April 15, 1885	dis 20 1/2 @ 20&10 1/2
Star Coll, list April 15, 1885	dis 20 1/2 @ 20&10 1/2
Victor Coll	dis 60 @ 60&10 1/2
Champion Coll	dis 60&10 1/2 @ 60&10 1/2 5/8
Philadelphia	dis 50 1/2 @ 50&10 1/2
Cowell's No. 1, 7 doz, \$18.00; No. 2, \$16.00	dis 50 1/2 @ 50&10 1/2
Rubber, complete	dis 50 1/2 @ 50&10 1/2
Hercull Coll, 7 doz, \$18.00 and Spring	dis 35 @ 35&10 1/2

Drawing Knives

P. S. & W.	dis 75&10 1/2 @ 75&10 1/2 5/8
Mix	dis 75&10 1/2 @ 75&10 1/2 5/8
New Haven and Middlesex	dis 75&10 1/2 @ 75&10 1/2 5/8
Merrill	dis 75&10 1/2 @ 75&10 1/2 5/8
Witherby and Douglass	dis 75&10 1/2 @ 75&10 1/2 5/8
W. & L. J. White	dis 75&10 1/2 @ 75&10 1/2 5/8
Bradley's	dis 75&10 1/2 @ 75&10 1/2 5/8
Adjustable Handle	dis 25 @ 25&10 1/2
Wilkinson's Folding	dis 25 @ 25&10 1/2

Drills and Drill Stocks

Blacksmiths	dis 17 1/2
Self-Feeding	dis 75 1/2 @ 75&10 1/2
Breast, P. S. & W.	dis 40&10 1/2 @ 40&10 1/2 5/8
Breast, Wilson's	dis 40&10 1/2 @ 40&10 1/2 5/8
Breast, Millers Falls	dis 40&10 1/2 @ 40&10 1/2 5/8
Breast, Bartholomew's	dis 40&10 1/2 @ 40&10 1/2 5/8
Ratchet, Merrill's	dis 40&10 1/2 @ 40&10 1/2 5/8
Ratchet, Ingersoll's	dis 40&10 1/2 @ 40&10 1/2 5/8
Ratchet, Parker's	dis 40&10 1/2 @ 40&10 1/2 5/8
Ratchet, Whitney's	dis 40&10 1/2 @ 40&10 1/2 5/8
Ratchet, Weston's	dis 40&10 1/2 @ 40&10 1/2 5/8
Ratchet, Moore's Triple Action	dis 25 @ 25&10 1/2
Whitney's Hand Drill, Plain, \$11.00, Adjustable	dis 25 @ 25&10 1/2
Wilson's Drill Stocks	dis 17 1/2 @ 17&10 1/2
Automatic Boring Tools	dis 17 1/2 @ 17&10 1/2

Morse

Standard	dis 50&10 1/2 @ 50&10 1/2 5/8
Syracuse	dis 50&10 1/2 @ 50&10 1/2 5/8
Cleveland	dis 50&10 1/2 @ 50&10 1/2 5/8
Wilfams	dis 50&10 1/2 @ 50&10 1/2 5/8
Drill Bits—See Augers and Bits	
Drill Chucks—See Chucks	
Dripping Pans—Small sizes	dis 50 1/2 @ 50&10 1/2
Large sizes	dis 50 1/2 @ 50&10 1/2

Egg Beaters

Egg Beaters	dis 22 1/2 @ 22&10 1/2
National	dis 22 1/2 @ 22&10 1/2
Family (T. & S. Mfg. Co.)	dis 22 1/2 @ 22&10 1/2
Kingston (Standard Co.)	dis 22 1/2 @ 22&10 1/2
Acme (Standard Co.)	dis 22 1/2 @ 22&10 1/2
Duplex (Standard Co.)	dis 22 1/2 @ 22&10 1/2
Rival (Standard Co.)	dis 22 1/2 @ 22&10 1/2
Triumph (T. & S. Mfg. Co.)	dis 22 1/2 @ 22&10 1/2
Advance No. 1	dis 22 1/2 @ 22&10 1/2
Advance No. 2	dis 22 1/2 @ 22&10 1/2
Bryant's	dis 22 1/2 @ 22&10 1/2
Double (Hamblin & Russell Mfg. Co.)	dis 22 1/2 @ 22&10 1/2
Key (Hamblin & Russell Mfg. Co.)	dis 22 1/2 @ 22&10 1/2
Triple (Hamblin & Russell Mfg. Co.)	dis 22 1/2 @ 22&10 1/2
Spiral (Hamblin & Russell Mfg. Co.)	dis 22 1/2 @ 22&10 1/2
Paine, Diehl & Co's	dis 22 1/2 @ 22&10 1/2

Egg Poachers

Buffalo Steam Egg Poachers, 7 doz, No. 1, \$8.00	dis 25 1/2 @ 25&10 1/2
No. 2, \$9.00	dis 25 1/2 @ 25&10 1/2
Electric Hall Mfgs.—Wallensack's	dis 20 1/2 @ 20&10 1/2
Bigelow & Dowse	dis 20 1/2 @ 20&10 1/2
Emery	dis 20 1/2 @ 20&10 1/2
40 gr.	dis 20 1/2 @ 20&10 1/2
150 gr.	dis 20 1/2 @ 20&10 1/2
Flour, CF	dis 20 1/2 @ 20&10 1/2
8 1/2	dis 20 1/2 @ 20&10 1/2
10 1/2	dis 20 1/2 @ 20&10 1/2
12 1/2	dis 20 1/2 @ 20&10 1/2
14 1/2	dis 20 1/2 @ 20&10 1/2
16 1/2	dis 20 1/2 @ 20&10 1/2
18 1/2	dis 20 1/2 @ 20&10 1/2
20 1/2	dis 20 1/2 @ 20&10 1/2
22 1/2	dis 20 1/2 @ 20&10 1/2
24 1/2	dis 20 1/2 @ 20&10 1/2
26 1/2	dis 20 1/2 @ 20&10 1/2
28 1/2	dis 20 1/2 @ 20&10 1/2
30 1/2	dis 20 1/2 @ 20&10 1/2
32 1/2	dis 20 1/2 @ 20&10 1/2
34 1/2	dis 20 1/2 @ 20&10 1/2
36 1/2	dis 20 1/2 @ 20&10 1/2
38 1/2	dis 20 1/2 @ 20&10 1/2
40 1/2	dis 20

Google

Hardware.
 Flat Head, Iron.....dis 55¢
 Round Head, Iron.....dis 55¢
Bench and Hand-
 Bench, Iron.....dis 55¢10 @ 55¢10¢10
 Bench, Wood, Hickory.....dis 55¢10
 Bench, Wood, Hickory.....dis 55¢10 @ 55¢10¢10
 Hand, Wood.....dis 55¢10 @ 55¢10¢10
 Lar, Blunt Point.....dis 75¢ @ 75¢10
 Conch and Lag, Gimlet Point.....dis 75¢
 Bed.....dis 25¢5 @ 25¢5
 Hand Rail, Barget's.....dis 65¢10
 Hand Rail, Humson, Beckley & Co.'s.....dis 70¢10¢75
 Hand Rail, Am. Screw Co.....dis 75¢
 Jack Screws, Millers Falls List.....dis 60¢ @ 50¢5
 Jack Screws, P. & W.....dis 35¢
 Jack Screws, Sargent.....dis 60¢10 @ 60¢10¢5
 Jack Screws, Stearns.....dis 40¢ @ 40¢10
Scroll Saws.
 Lester, complete, \$10.00.....dis 35¢
 Rogers, complete, \$4.00.....dis 25¢
 Barnes' Scrollers and Cabinet Makers', \$15.....dis 25¢
 Barnes' Scroll Saw Blades.....dis 35¢
Scythe Sheaths......dis 60¢2
Shears.
 American (Cast) Iron.....dis 75¢10 @ 75¢10¢5
 Pruning.....See Pruning Hooks and Shears
 Barnard's Lamp Trimmers.....dis 20¢2
 Tinner's.....dis 20¢2
 Seymour's, List Dec. 1888, dis 60¢10¢10 @ 60¢10¢10¢5
 Reinech's, List Dec. 1888, dis 60¢10¢10 @ 60¢10¢10¢5
 Reinech's Tailor's Shears.....dis 35¢4
 First quality C. S. Trimmers.....dis 50¢ @ 50¢10
 Second quality C. S. Trimmers.....dis 50¢10 @ 50¢10¢10
 Acme Cast Shears.....dis 10¢10
 Diamond Cast Shears.....dis 10¢
 Clipper.....dis 10¢10
 Victor Cast Shears.....dis 75¢10 @ 75¢10¢5
 Howe Bros. & Hubert, Solid Forged Steel.....dis 40¢
 Cleveland Machine Co., Solid Steel Forged.....dis 70¢
 Claus Shear Co., Japaned.....dis 70¢
 Claus Shear Co., Nickel, same list.....dis 60¢
Shovels.
 Siding Door.....dis 60¢10 @ 60¢5
 R. W. & Co., List July, 1888.....dis 60¢10 @ 60¢5
 R. & L., List Dec. 18, 1888.....dis 60¢10
 Corbin's List.....dis 60¢10¢2
 Patent Roller.....dis 60¢10¢2
 Patent Roller, Hatfield's.....dis 75¢
 Russell's Anti-Friction, List Dec. 18, 1888, dis 60¢2
 Moore's Anti-Friction.....dis 60¢
Siding Shovels.
 R. & L., List Dec. 18, 1888.....dis 60¢10¢2
 Sargent's List.....dis 60¢10
 Reading List.....dis 60¢10¢10
Ship Tools.
 L. & J. White.....dis 30¢5
 Albion Mfg. Co.....dis 35¢
Shoes, Horse, Mule, &c.
Shovel.
 Burden's, Perkins', Phoenix, at factory.....\$4.00
 Mule—Add \$1 per keg to above prices.
Shovel, Wrought—
 Ton lots.....dis 95¢
 1000 b lots.....dis 95¢
 500 a lots.....dis 105¢
 Shot.....(Boston prices, 25¢ off, each, 5 days.)
 Drop, 6 bag, 25 b.....\$1.15
 Drop, 6 bag, 5 b......30
 Buck and Chilled, 6 25-b bag.....1.41
 Buck and Chilled, 6 5-b bag......34
Shovels and Spades.
 Ames' Shovels, Spades, &c., List Nov. 1, 1888.....dis 30¢
 Horna—Jobbers frequently give 5¢ & 7½¢ extra on above.
 Griffith's Black Iron.....dis 50¢10
 Griffith's O. S.....dis 60¢ @ 60¢10
 Griffith's Solid Cast Steel & R. Good.....dis 30¢
 Old Colony (Sanford Fork & Tool Co.).....dis 20¢
 St. Louis Shovel Co.....dis 30¢ @ 20¢74
 Huxley, Bins & Co.....dis 15¢ @ 25¢
 Hubbard & Co.....dis 20¢2¢74
 Lehigh Mfg. Co.....dis 50¢10
 Payne Petroleum & Son, List January, 1888.....dis 30¢
 Remington's (Lowman's Patent).....dis 30¢10 @ 40¢
 Rowland's, Black Iron.....dis 50¢10
 Rowland's Steel.....dis 60¢5 @ 60¢10
Shovels and Trenches.
 Iron Head.....dis 60¢10 @ 60¢10¢5
 Brass Head.....dis 60¢10¢10
Shovel, Thimble.
 Western List.....dis 75¢5 @ 75¢10
 Columbus Wrt. Steel, List Nov. 1, 1887.....dis 20¢
 Coldbrookdale Iron Co.....dis 50¢10
 Utica P. & T. Steins.....dis 60¢
 Utica Turned and Fitted.....dis 35¢
Sieves.
 Buffalo Metallic, S. & C. Co., new list.....dis 50¢5¢10
 Barter Flour Sifters.....dis 30¢
 Smith's Adjustable Sifters.....dis 30¢
 Smith's Adjustable Milk Strainer.....dis 30¢
 Smith's Adjustable F. & C. Strainer.....dis 30¢1.75
Sieves, Wooden.
 Mesh 15, Nested, 70¢
 Mesh 30, Nested, 70¢
 Mesh 34, Nested, 70¢
 Mesh 40, Nested, 70¢
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CURRENT METAL PRICES.

DECEMBER 19, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
1 to 2 in. round and square.	1 1/2 to 2 1/2 @ 2.00¢
1 to 6 in. x 1/2 to 1 in.	1 1/2 to 2 1/2 @ 2.00¢
Refined Iron:	
1 to 2 in. round and square.	2 1/2 to 3 1/2 @ 2.10¢
1 to 4 in. x 1/2 to 1 1/2 in.	2 1/2 to 3 1/2 @ 2.10¢
4 1/2 to 6 in. x 1/2 to 1 in.	2 1/2 to 3 1/2 @ 2.10¢
1 to 6 in. x 1/2 and 5-16	2 1/2 to 3 1/2 @ 2.20¢
Rods—1/2 and 11-16 round and sq.	2 1/2 to 3 1/2 @ 2.20¢
Bands—1 to 6 x 3-16 to No. 12	2 1/2 to 3 1/2 @ 2.4¢
"Burden Best" Iron, base price.	3 00 @ 2.4¢
Burden's "H. B. & S." Iron, base price.	3 00 @ 2.4¢
Ulster	2 80 @ 2.4¢
Norway Rods	4 00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery.	
Toe Calk, Tire and Sleigh Shoe, base price in small lots.	2 1/2 @ 3¢
Best Cast Steel, base price in small lots.	5 1/2 @ 5¢
Best Cast Steel Machinery, base price in small lots.	5 1/2 @ 5¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16.	2 7/8 @ 2.80¢
17 to 20.	2 8/8 @ 3 0/8
21 to 24.	2 9/8 @ 3 1/8
25 and 36.	2 10/8 @ 3 3/8
27 and 30.	2 11/8 @ 3 5/8
28.	2 12/8 @ 4 0/8
B. B.	2d qual.
Galv'd, 14 to 20.	4 50 @ 4 38
Galv'd, 1 to 24.	4 87 1/2 @ 4 75
Galv'd, 25 to 26.	5 25 @ 5 12
Galv'd, 27.	5 62 1/2 @ 5 48
Galv'd, 28.	6 00 @ 5 85
Patent Planchet.	7 10 @ 6 94
Russia.	9 1/2 @ 10¢
American Cold Rolled B. B.	5 1/2 @ 7¢

English Steel from Store.

Best Cast	15¢
Extra Cast	16 1/2¢
Swaged, Cast	16¢
Best Double Shear	15¢
Blister, 1st quality	12 1/2¢
German Steel, Best	10¢
2d quality	9¢
3d quality	8¢
Sheet Cast Steel, 1st quality	15¢
2d quality	14¢
3d quality	13 1/2¢

METALS.

Tin.

Banca, Pigs.	24¢
Straits, Pigs.	24¢
English, Pigs.	23 1/2¢
Straits in Bars	25¢

Tin Plates.

Charcoal Plates—Bright.	Per box.
Melny Grade.	
1C, 10 x 14.	\$6.75 @ \$6.00
1C, 12 x 12.	6.00 @ 6.25
1C, 14 x 20.	5.75 @ 6.00
1C, 20 x 28.	12.00 @ 12.50
1X, 10 x 14.	7.25 @ 7.50
1X, 12 x 12.	7.50 @ 7.75
1X, 14 x 20.	7.25 @ 7.50
1X, 20 x 28.	15.00 @ 15.50
1C, 12 1/2 x 17.	5.50 @ 5.75
1C, 12 1/2 x 17.	7.00 @ 7.25
Call and Grade.	
1C, 10 x 14.	5.75 @ 6.00
1C, 12 x 12.	6.00 @ 6.25
1C, 14 x 20.	5.75 @ 6.00
1X, 10 x 14.	7.25 @ 7.50
1X, 12 x 12.	7.50 @ 7.75
1X, 14 x 20.	7.25 @ 7.50
Allaway Grade.	
1C, 10 x 14.	5.12 1/2 @ 5.87 1/2
1C, 12 x 12.	5.50 @ 5.75
1C, 14 x 20.	5.12 1/2 @ 5.87 1/2
1C, 20 x 28.	11.00 @ 11.50
1X, 10 x 14.	6.00 @ 6.25
1X, 12 x 12.	6.25 @ 6.50
1X, 14 x 20.	6.00 @ 6.25
1X, 20 x 28.	12.00 @ 13.00
1C, 12 1/2 x 17.	4.75 @ 5.00
1C, 12 1/2 x 17.	5.75 @ 6.00

Coke Plates—Bright.	
Steel Coke.—1C, 10 x 14, 14 x 20.	\$4.75 @ \$5.00
10 x 20.	7.25 @ 7.50
20 x 28.	9.75 @ 10.25
1X, 10 x 14, 14 x 20.	5.50 @ 5.75
BV Grade.—1C, 10 x 14, 14 x 20.	4.40 @ 4.60

Charcoal Plates—Terne.	
Dean Grade.—1C, 14 x 20.	\$4.40 @ \$4.62 1/2
20 x 28.	9.00 @ 9.25
1X, 14 x 20.	4.40 @ 4.62 1/2
20 x 28.	11.00 @ 11.37 1/2
Abecarne Grade.—1C, 14 x 20.	4.25 @ 4.50
20 x 28.	9.00 @ 9.25
1X, 14 x 20.	5.25 @ 5.50
20 x 28.	10.50 @ 10.80

Tin Boiler Plates.

1XX, 14 x 28.	112 sheets. @ \$12.50 @ \$12.75
1XX, 14 x 28.	112 sheets. @ 12 75 @
1XX, 14 x 31.	112 sheets. @ 14.25 @

Copper.

Duty: Pig. Bar and Ingot, 4¢; Old Copper, 3¢	
Manufactured (including all articles of which Copper is a component of chief value).	45¢ ad valorem.

Ingot.

Lake.	@ 18¢
"Anchor" Brand.	@ 17 1/2¢

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Weights per square foot and prices per pound.										
Not wider than	Not longer than	And longer than	Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30	72		25	25	25	26	27	28	31	33
36		72	25	25	25	26	27	28	31	33
36	96		25	25	25	26	27	28	31	33
48		96	25	25	25	26	27	28	31	33
48	96		25	25	25	26	27	28	31	33
60		96	25	25	25	26	27	28	31	33
60	96		25	25	25	26	27	28	31	33
84		96	25	25	25	26	27	28	31	33
84	96		25	25	25	26	27	28	31	33
Over 84 in. wide		96	28	30	30	30	30	30	30	30

All Bath Tub Sheets. 16 oz. 14 oz. 12 oz. 10 oz. Per pound. \$0.43 0.30 0.32 0.35

Bolt Copper, 1/2 inch diameter and over, per pound.

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 60 inches diameter, up to 96 inches diameter inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

12 ounce to square foot and heavier. 28¢

12 ounce and up to 14 ounce to square foot. 29¢

10 ounce and up to 12 ounce. 31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each. 8¢

Tinning sheets on one side, 30 x 60 each. 80¢

For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each. 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each. 18¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each. 18¢

Tinning sheets on one side, other sizes, per square foot. 2 1/2¢

For tinning both sides double the above prices.

Planchet Copper.

Planchet Copper List May 5, 1888. Net

Brass and Copper Tubes.

Seamless Copper.	Seamless Brass.
1/2 inch 1/2 lb.	50¢
1/2 inch 1/2 lb.	44¢
1/2 inch 1/2 lb.	42¢
1/2 inch 1/2 lb.	40¢
1/2 inch 1/2 lb.	38¢
1/2 inch 1/2 lb.	37¢
1/2 inch 1/2 lb.	34¢
1/2 inch 1/2 lb.	31¢

Roll and Sheet Brass.

Discount from list. 10 @ 15¢

Spelter.

Duty: Pig. Bars and Plates, \$1.50 @ 100 lb.

Lead.

Duty: Pig. 32 @ 100 lb. Old Lead, 2¢ @ 100 lb. Pipe and Sheets, 3¢ @ 100 lb.

Zinc.

Duty: Sheet, 2 1/2¢ @ 100 lb.

Antimony.

Cookson. 13 1/2¢ @ 14¢

Plumbers' Brass Work.

Ground Bibbs and Stops. 55¢ @ 10¢

Corporation Cocks, "Mueller" Pattern, from Western list.

Ground Basin and Shampooing Cocks.	55¢ @ 10¢
Compression Basin Cocks.	50¢ @ 10¢
Compression Basin and Sink Cocks.	50¢ @ 10¢
Compression Pantry Cocks.	50¢ @ 10¢
Compression Double Basin and Shampooing Cocks.	50¢ @ 10¢
Compression Double Bath Cocks.	50¢ @ 10¢
Compression Bibbs, Urinal Cocks, Sill Cocks.	50¢ @ 10¢
Stopper Cocks, Hydrant Cocks and Ball Cocks.	50¢ @ 10¢
Basin Plugs and Basin Grates.	50¢ @ 10¢
Bath and Wash Trav Plugs.	50¢ @ 10¢
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Cocks.	50¢ @ 10¢
Valves and Suction Baskets.	50¢ @ 10¢
Basin Clamps, Basin Joints and Strainers.	50¢ @ 10¢
Boiler Couplings, Ground Face, per set.	\$1.25 @ 10¢
Boiler Couplings, Plain Face, per set.	\$1.20 @ 10¢
Water Back Valve and Plain Couplings, Elder.	50¢ @ 10¢
ing Nipples and Unions.	50¢ @ 10¢
Union Joints.	50¢ @ 10¢
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides.	50¢ @ 10¢
Hose Goods.	50¢ @ 10¢

Steam and Gas Fitters' Brass and Iron Work.

	Discount per cent.
Brass Globe Valves.....	60¢ @ 10¢
Finish'd Brass Globe Valves, with Finish'd Brass Wheels.....	40¢ @ 10¢
Brass Globe Valves, with Patent Wood Wheels.....	60¢ @ 10¢
Brass Globe Angle and Corner Valves.....	60¢ @ 10¢
Brass Radiator Angle Valves.....	60¢ @ 10¢
Brass Radiator Angle Valves, Frink's Patent.....	60¢ @ 10¢
Brass Cross and Check Valves.....	60¢ @ 10¢
Brass Check Valves.....	60¢ @ 10¢
Brass Hose Valves.....	60¢ @ 10¢
Brass and Iron Frink Valves.....	60¢ @ 10¢
Brass Safety Valves.....	60¢ @ 10¢
Brass Vacuum Valves.....	60¢ @ 10¢
Brass Whistle Valves.....	60¢ @ 10¢
Brass Balance, Back Pressure and Foot Valves.....	50¢ @ 10¢
Brass Butterfly and Throttle Valves.....	50¢ @ 10¢
Brass Pump Valves.....	50¢ @ 10¢
Brass Steam Cocks.....	50¢ @ 10¢
Brass Service, Meter and Union Meter Cocks.....	50¢ @ 10¢
Brass Whistles, Water Gauges and Oil Cops.....	50¢ @ 10¢
Brass Hollow Plug, Tallow and Globe Oil Cops.....	50¢ @ 10¢
Brass Lubricators.....	60¢ @ 10¢
Brass Air Valves.....	60¢ @ 10¢
Brass Air Cocks.....	60¢ @ 10¢
Brass Gauge Cocks.....	50¢ @ 10¢
Brass Cylinder Cocks and Steam Bibbs.....	50¢ @ 10¢
Brass Swing Joints and Expansion Joints.....	50¢ @ 10¢
Brass Test Pumps.....	50¢ @ 10¢
Brass Steam Fittings, Rough.....	50¢ @ 10¢
Brass Steam Fittings, Finished.....	50¢ @ 10¢
Brass Union Joints.....	50¢ @ 10¢
Brass Soldering Unions and Nipples.....	50¢ @ 10¢
Brass Hose Fittings, Fusible and Boiler Plugs.....	50¢ @ 10¢
Iron Body Globe, Angle, Cross and Check Valves.....	60¢ @ 10¢
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves.....	60¢ @ 10¢
Iron Cocks, all Iron.....	60¢ @ 10¢
All Iron Valves.....	60¢ @ 10¢

Miscellaneous.

Miscellaneous.		Discount per cent.
Cast Iron Fittings.....	70¢	70
Plugs and Bushings.....	75¢	75
Malleable Iron Unions...	60¢	60
Malleable Iron Fittings.....	60¢	60

Paints.

Black, Lamp—Coach Painters.	22¢ @ 24¢
" Ordinary.	12¢ @ 15¢
Black, Ivory Drop, fair.	12¢ @ 15¢
" best.	12¢ @ 15¢
Black Paint, in oil, 8¢; 8¢; assorted cans, 11¢.	40¢ @ 55¢
Blue, Prussian, fair to best.	45¢ @ 55¢
" " in oil.	45¢ @ 55¢
" Chinese dry.	18¢ @ 20¢
" Ultramarine.	18¢ @ 20¢
Brown, Spanish.	14¢ @ 15¢
" Van Dyke.	10¢ @ 13¢
Dryers, Patent American, ass'd cans, 9¢; kegs 70¢.	15¢ @ 20¢
Green, Chrome.	15¢ @ 20¢
Green, Chrome in oil.	14¢ @ 18¢
Green, Paris.	good, 20¢; best, 25¢
Green, Paris in oil.	good, 30¢; best, 35¢
Iron Paint, Bright Red.	12¢ @ 14¢
Iron Paint, Brown.	12¢ @ 14¢
Iron Paint, Purple.	12¢ @ 14¢
Iron Paint, Ground in oil, Bright Red.	12¢ @ 14¢
Iron Paint, Ground in oil, Red.	12¢ @ 14¢
Iron Paint, Ground in oil, Brown.	12¢ @ 14¢
Iron Paint, Ground, Purple.	12¢ @ 14¢
Litharge.	6¢ @ 8¢
Mineral Paints.	2¢ @ 4¢
Orange Mineral.	10¢ @ 12¢
Red Lead, American.	6¢ @ 8¢
Red Venetian (Eng.) dry.	\$1.60 @ \$1.70
Red Venetian in oil, ass'd cans, 11¢; kegs, 8¢.	9¢ @ 12¢
Red Indian Dry.	10¢ @ 12¢
Rose Pink.	10¢ @ 12¢

THE IRON AGE

THURSDAY, DECEMBER 27, 1888.

The Armington & Sims Compound Engine.

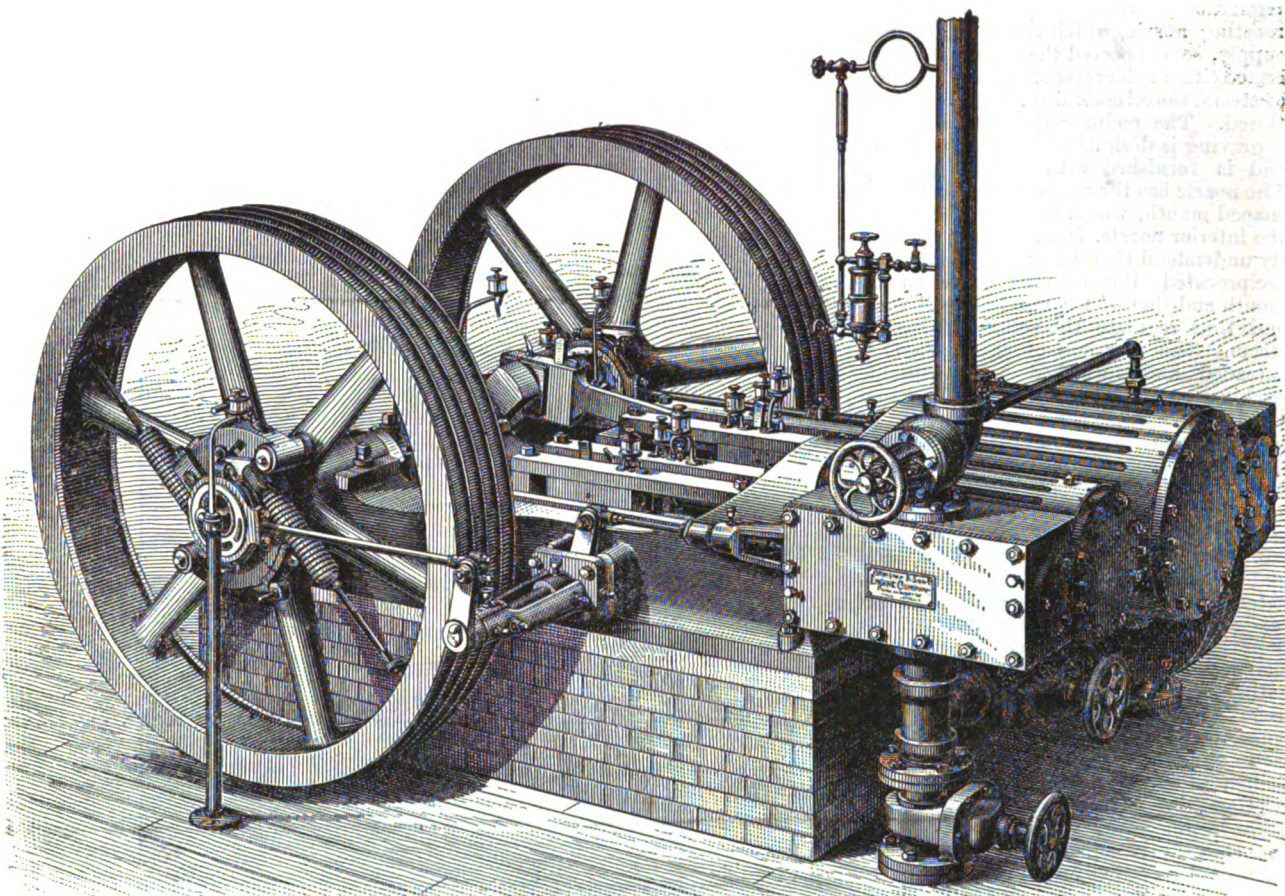
We show on this page one of a series of five compound condensing engines of 100 horse-power each, built by the Armington & Sims Engine Company, of Providence, R. I., for the machine shops of the Ordnance Department of the Washington Navy Yard. We regret having been unable to obtain sectional views and details of the engine, but trust that our readers will be enabled to get a fair idea from the engraving of the general design. The engines were referred to in an article on the works of the Armington & Sims Com-

journals. The wheels undergo a test at Fullerton. From present appearances it will take a year until the work is finished. It is difficult and heavy work to perform. In all about 4000 wheels will be exchanged.

Shipbuilding on the Delaware.—The iron shipbuilders along the Delaware River are crowded with orders for large ocean steamships. One of the largest shipbuilders said the contracts on hand would take two years to complete. The Pacific Mail Steamship Company are in the market for two iron steamships of about 5000 tons each, to cost \$2,000,000, for the San Fran-

and Miners' Line is building a new steam ship at Wilmington, Del., and Boulton, Bliss & Dallett have two iron ones at Cramps's yard and a wooden vessel at Bierly, Hillman & Co.'s yard, for the Venezuela trade. A contract for the construction of a revenue steamer for service in the Charleston, S. C., district, was, on Monday, awarded to Pusey, Jones & Co., at their bid of \$72,600.

Since the recent explosion of a petroleum vessel in Calais Harbor experiments have been made to determine what proportion of petroleum vapors mixed with a given amount of air will form explosive



COMPOUND ENGINE FOR THE GOVERNMENT ORDNANCE SHOPS AT WASHINGTON, BUILT BY THE ARMINGTON & SONS ENGINE COMPANY, PROVIDENCE, R. I.

pany, published in our issue of November 29, but we will repeat here that they are arranged for rope driving, as shown, each engine having two sheaves. Being double, with the cranks opposite, they are perfectly balanced, and can therefore be safely run at the high speed, 275 revolutions per minute, for which they were designed. The cylinders measure $10\frac{1}{2}$ and $16\frac{1}{2}$ inches in diameter, and have a common stroke of 12 inches. They will run with a boiler pressure of 220 pounds, and appear to be particularly well adapted for electric lighting where a high speed, close regulation and compactness are required.

The Lehigh Valley Railroad have 1000 box cars, of which they are changing the wheels at Packerton, East Penn. Junction, Bethlehem and Phillipsburg. Those which are now in use are not strong enough. They are being taken out and replaced with wheels having stronger

cisco and Central American trade. The Ward Steamship Line, to Cuban ports, contracted with the Delaware River Shipbuilding Works, on Monday last, for two iron steamships 310 feet long, to register 3000 tons each. Contracts have also been made for two iron steamships for the Ocean Steamship Line, to ply between New York, Philadelphia and Savannah. Charles Mallory contracted with the Delaware River Shipbuilding Company for a 3000-ton coasting steamer to cost \$350,000, for the Galveston line. The Morgan Steamship Line, plying between New York and New Orleans, the Pacific Improvement Company, of California, running to the North Pacific ports, and the Oregon Railway Company are also in the market for two new steamers each. Col. Edgarton Hogg, of the Oregon Pacific Railroad Company, also needs two iron steamships for the trade between San Francisco and Yaquina Bay, Oregon. The Merchants

compounds. In mixing ordinary illuminating gas with air it is found that one part of gas to eight of air gives the most violent explosion, and with the vapor of the volatile portion of petroleum nearly the same observation is made. With one part petroleum vapor to five of air no explosion takes place. With six parts of air there is a feeble explosion, and with from seven to nine parts a very violent one. With 12 parts of air the detonation is still violent, but with 16 parts it becomes feeble, and with one part vapor to twenty of air there is ordinarily no explosion.

Mr. Rudolph Hering, C. E., is authority for the statement that the load which one horse can draw on an asphalt pavement will require two horses on the best Belgian block, three horses on ordinary Belgian block, five and one-fifth horses on good cobble-stone and seven and four-fifths horses on bad cobble-stone.

The Reid Petroleum Burner for Steam Raising.

In view of the growing interest attached to the burning of petroleum under boilers for steam raising, and not less of the conflicting testimony as to the merits of the various burners which have been brought out for the purpose, we are specially pleased to be in position to give in this issue engravings of a burner, and of the setting used in connection with it, which seems to have given general satisfaction. The burner was invented by Mr. Joseph Reid, and is made by the Reid Burner Company, of Cleveland, Ohio.

From Fig. 1 on this page a good idea can be formed of the construction and function of the apparatus. It is of the injector type, steam being used as the spraying agent, and its novelty is found more particularly in the mechanism by which the admission of oil and steam into the combustion chamber is regulated. This regulation is effected by having a reciprocating nozzle, which controls the steam supply, so connected that when it is operated either to increase or diminish the flow of steam, the oil cock also will be opened or closed. The reciprocating nozzle in our engraving is designated by the letters C C, and is furnished with a steam part, B. The nozzle has the usual conical or funnel-shaped mouth, which fits over the end of the interior nozzle, D D. It will be readily understood that when the nozzle C is reciprocated the opening between its mouth and that of the nozzle D will vary, and thus regulate the volume of issuing steam. The rear end of the nozzle C is threaded and furnished with suitable packing and a gland to insure steam tightness, while the fixed nozzle D is provided with an internally threaded flanged collar set in a circumferential groove, as shown. This collar has a wrench socket and is adapted to engage the thread of the nozzle C, and when turned, moves the latter back and forth as desired. The oil-pipe A enters the side of the nozzle D, and extends parallel with it on the interior. It is provided also with a rack, regulated by the lever H. Rigidly fixed to the reciprocating nozzle C is a lug, which has an axial screw threaded pin working the connecting rod R. The latter carries an index hand, and its left-hand end is attached to the oil-cock lever H, an anti-friction roller being arranged to work in a slot in this lever. It will thus be seen that the oil-cock and steam regulator are so connected as to be compelled to work in unison. The graduated strip S passes around the oil-pipe A, and its opposite end is slotted so as to permit free motion of the pin of the connecting rod R. The scale rod S has a guide, as shown, through which the rod R passes. After the parts have been put together and tested, the rod S is suitably graduated to indicate the quantity of oil passing into the burner for a given time. The burners are made in four sizes: No. 1, for large boilers and other very heavy work; No. 2, for boilers of from 5 to 60 horse-power and lighter work; No. 3, for burning brick, tile, furnaces, small boilers, &c., and No. 4, for burning lime. They are simple in construction, easily operated, and low in cost. During the six months that they have been on the market they have given highly satisfactory results wherever used.

In Figs. 2, 3 and 4 we show the form of boiler setting which is recommended for use in connection with them. It will be noticed that the grate-bars and firing and ash-pit doors have been removed. A wall is built up from the floor to a level with the bearing bar, about 4 inches thick and 32 inches distant from the front wall. From this an incline is made to meet the top of the old bridge wall, the space be-

tween the walls being filled with broken stone or clinkers. The angle of incline between these walls should be as near 45° as possible. Should it occur that the distance between the walls is too great to permit of this, it should be accomplished by making the angle of 45° from the front wall, thence going back in a straight line to the top of the old bridge wall. This wall and incline should be faced with the best fire-brick and well cemented. The fire chamber should be narrowed the whole depth and length, and the bed made from the hollow bridge wall back, with ashes or clinkers, leaving a space of 16 inches

back end of the lower and the front end of the upper section. Fire-brick standing on end is used in these. The whole should be thoroughly cemented. The ash-pit should then be filled with ashes to a level with the lower section. The air passing through all these air flues becomes greatly heated, that in the rear flues reaching from 800° to 900° F., and that in the front from 400° to 500° F. at the point of delivery. The firing place and ash-door openings should then be closed entirely. Dampers may be placed in the air flues to assist in regulating the supply. The figures may be changed as circum-

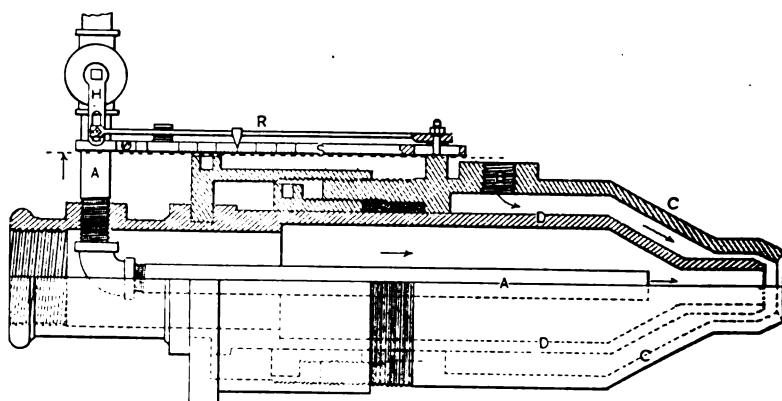


Fig. 1.—Half Section of Burner.

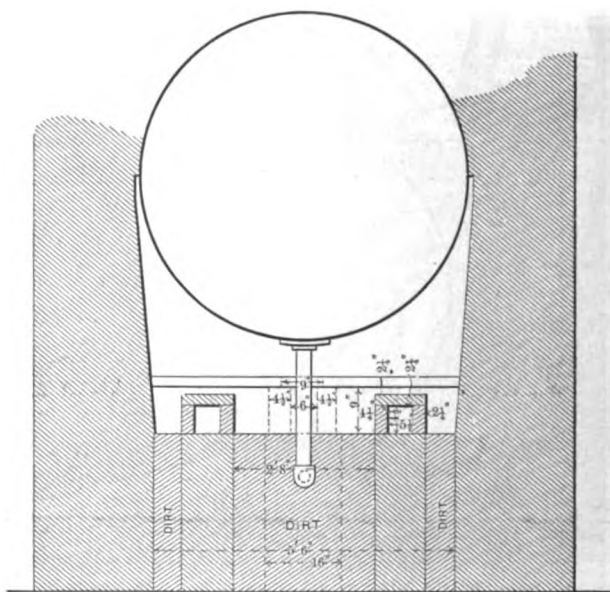


Fig. 2.—Section Along C D of Fig. 3.

THE REID PETROLEUM BURNER FOR STEAM RAISING.

between it and the bottom of the boiler. An 8-inch wall should be erected in the rear of and against the old bridge wall to within 23 inches of the bottom of the boiler; upon this a hollow bridge wall, with space of 5 inches.

This is covered with brick laid edge-wise, 4 inches apart. The distance between the upper sides of these bricks and the bottom of the boiler will be about 8 inches. Two 6-inch air flues are then constructed, beginning at the back wall and extending to and connecting with the hollow bridge wall (see Fig. 4). They are run parallel to the side walls, and at a distance of from 15 to 18 inches from them. They may be made of fire-brick or tile. Two supporting walls should be built for these flues. Two air flues should also be built in the ash-pit, as shown in Fig. 3, 7-inch openings being left at the

stances require. In using ashes care should be taken to have them as free from coal dust as possible. The cost of such a setting will be low, and one burner, it is stated, will be sufficient for any boiler of 100 horse-power or less.

When a burner is set under a boiler it should be connected with both the steam and oil line by a swinging joint, so that the direction of the flame can be easily changed upward or downward, or to either side, as may be required to secure a uniform heat. The front end of the burner should be about 6 inches inside of the fire opening, and after being connected up, this opening around the burner should be bricked up tight so as to prevent the cold air from entering the furnace. In starting the burner care should be taken to have the oil shut off entirely, so that there is no flow of oil whatever from the burner.

The dampers being open steam should be turned on slowly, in order to blow any water or other substances out of the nozzle. A lighted torch then being put in the furnace, the oil is turned on slowly until the fire is started. The amount of oil can be regulated at will by the valves on the burner. In shutting off, the oil should be turned off first.

We understand that in all cases where the Reid burner has been employed eminently satisfactory results have been obtained. The Union Steel Company and the North Chicago Rolling Mill Company, of Chicago, Ill., highly praise it. Accord-

oil flame from the Reid burner, we are told, has developed no difficulty of this kind. Altogether the favorable experience with the system has induced the North Chicago Rolling Mill Company to make arrangements for its introduction into both their North Chicago and Bay View mills—testimony which it is well worth considering.

Though we have shown the burner here in connection with a setting for steam raising, we would repeat that the device is turned out in modified forms for the different other uses to which the system may be applied, such as for lime

merated for oil over coal by the manufacturers who have used both will evidently cause them to continue the former, even after the consideration of economy shall have been eliminated, because of the greater uniformity of heat produced, the better control of the heat secured and the lessened repairs to boilers.

The insurance companies have abated their opposition to the use of oil for fuel, and thus a serious obstruction to its introduction has been removed. Inasmuch as the greatest danger in using it has arisen from the storage of large quantities in tanks near the works, this matter has re-

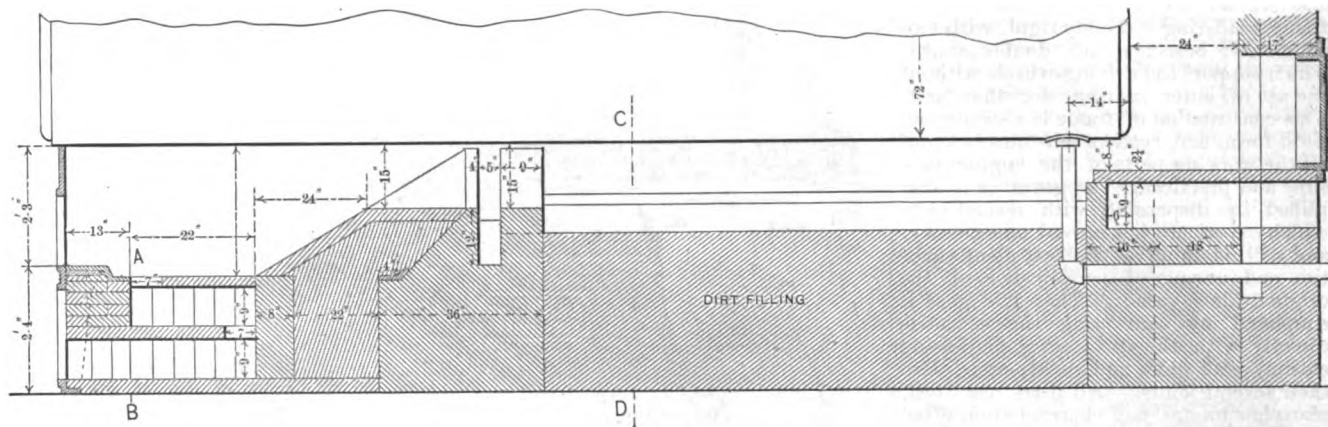


Fig. 3.—Vertical Section of Boiler Setting with Reid Burner.

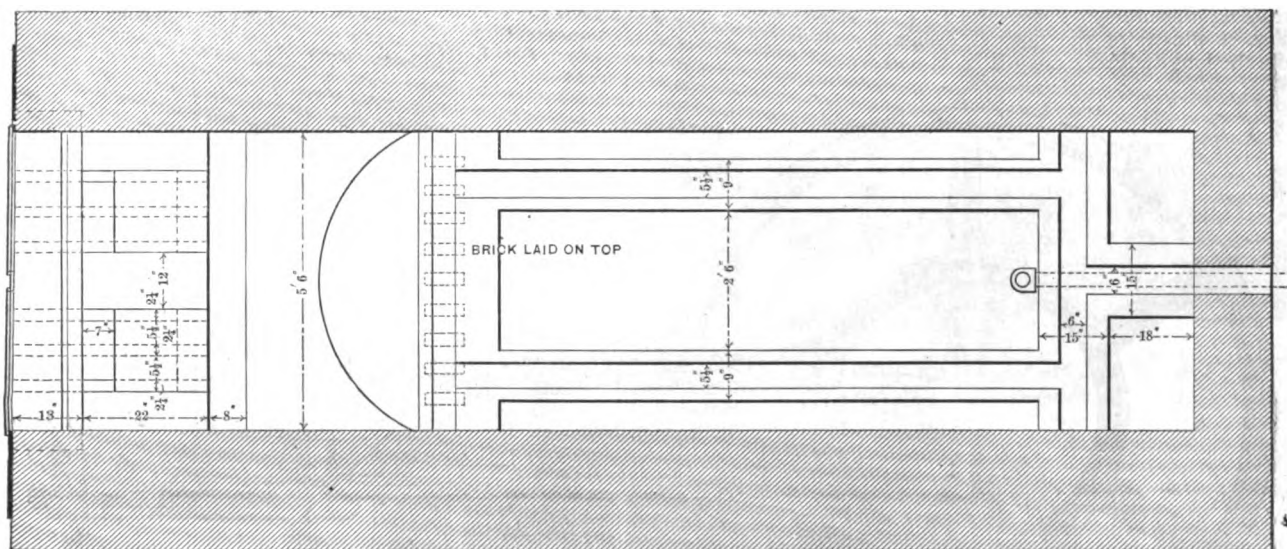


Fig. 4.—General Plan.

THE REID PETROLEUM BURNER FOR STEAM RAISING.

ing to Mr. E. C. Potter, of the latter company, their boiler house at South Chicago formerly contained 12 boilers, from which, when using coal, they could not get steam sufficient for their requirements. Two boilers were, therefore, added. Now, with the use of oil, these boilers are run in two batteries, one of eight and one of six boilers. The main battery of eight boilers has, under the new arrangement, been found to yield almost all the steam required, only a moderate demand for assistance being made on the other six. With the whole number going the supply is much in excess of the demand. The boilers are 16-foot flue boilers made up in the old way of a comparatively large number of small sheets exposing numerous seams to the fire. While using coal the boilers were almost constantly undergoing repairs, owing to leaking seams; but the

and brick kilns, furnaces, &c. The question of the relative cheapness of oil and coal naturally comes up for consideration in this connection. While nothing positive can be claimed for the future, it seems certain that for a long time to come the supply of oil will be large enough to meet the demand without any considerable rise in price, especially when it is considered that the field for the use of oil fuel is restricted somewhat by questions of transportation, the development of natural gas territory and the location of manufacturers in close proximity to coal deposits. The use of oil will grow in the vicinity of towns and cities, where the formation of great volumes of smoke and soot is highly objectionable, and in districts somewhat remote from coal deposits, making the cost of coal comparatively high. The advantages enu-

ceived careful attention, and the plan of burying the tanks under ground has been adopted, and is being generally followed. In some cases pumps are used to force the oil to the furnaces, but water pressure is now being applied wherever available, to secure a continuous flow of oil without the use of pumping machinery. We may add that the Reid system has been adopted by the Union Steel Company and the North Chicago Rolling Mill Company, of Chicago, the Joliet Steel Company, of Joliet, Ill., the United States Rolling Stock Company, of Hegewisch, Ill., the J. I. Case Plow Works, of Racine, Wis., the Wisconsin Malleable Iron Company, of Milwaukee, and a large number of other manufacturers, including brick and lime burners, and others requiring intense and uniform heat in conducting their operations.

The Ideal Engine.

The Ideal engine, of which we present engravings in this issue, is an improved form of the well-known high-speed automatic engine built by A. L. Ide & Son, of Springfield, Ill., and was designed to meet special requirements in electric lighting and other uses where high rotative speed, small space, perfect regulation and a reliable, durable and economical power are required.

The construction, principle and operation are the same as in the Ide engine, the only difference being that the Ideal has a double frame with two sides, like a right and left hand Ide engine combined in one frame, rendering it doubly rigid, with two main-shaft bearings and double cranks, which support the driving-wheels without the use of outer bearings for the shaft. This construction of frame is a strong and rigid form, and renders self-lubrication of all the working parts of the engine possible and practical. The governor is simplified by dispensing with several parts which experience has proved unnecessary, and still retaining all the excellent qualities and unequalled performance of the original Ide governor. The valve gear is simplified by connecting the eccentric directly with the valve stem, dispensing entirely with slides and rocker-arms, with their several joints. All parts are steel, phosphor bronze and charcoal iron, fitted to templets and gauges, and are interchangeable. Every engine is thoroughly tested by running in the works, and the valves and governors are adjusted and set to operate perfectly under varying loads and steam pressures.

Fig. 1 illustrates the general design, while the longitudinal section, Fig. 2, and

fourths of the oil ordinarily used, besides giving more perfect lubrication. It will be seen from Fig. 2 that the oil is thrown upon the guides, and, being wiped from the top guide by the slide, passes through a tube in the top slide, entering a funnel in the connecting-rod, and after passing through the bearing drips to bottom of crosshead. The piston rod also receives

gine disks are in rotation the centrifugal force causes the oil to be thrown into pockets provided in the hood over the disks, illustrated on the preceding page. From these pockets the oil flows through the pipes into a receptacle or pocket cast upon the main bearings. From this point it flows into the groove and channel connecting with the crank-pin, which is hol-

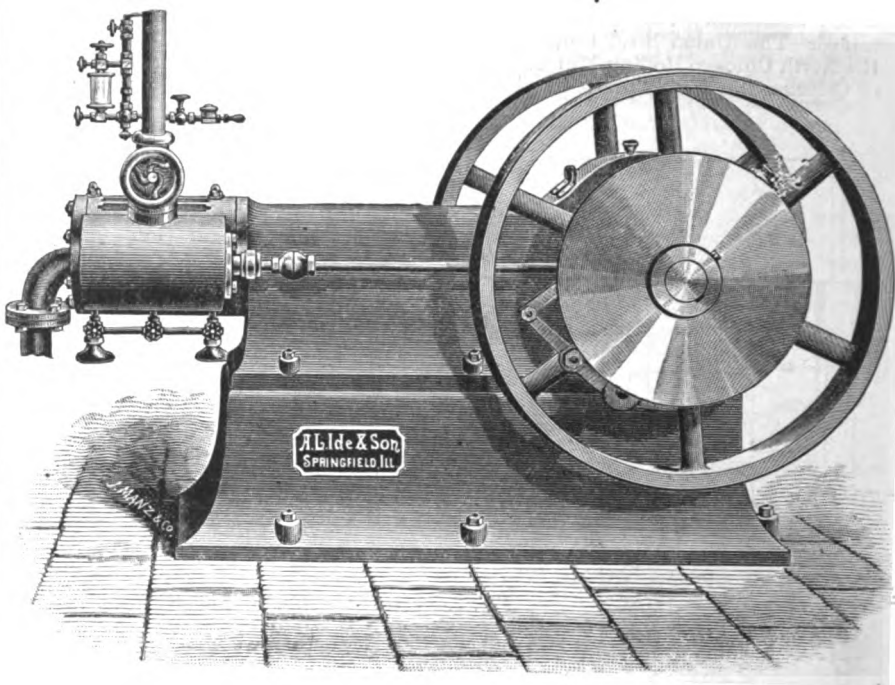


Fig. 1.—General View.

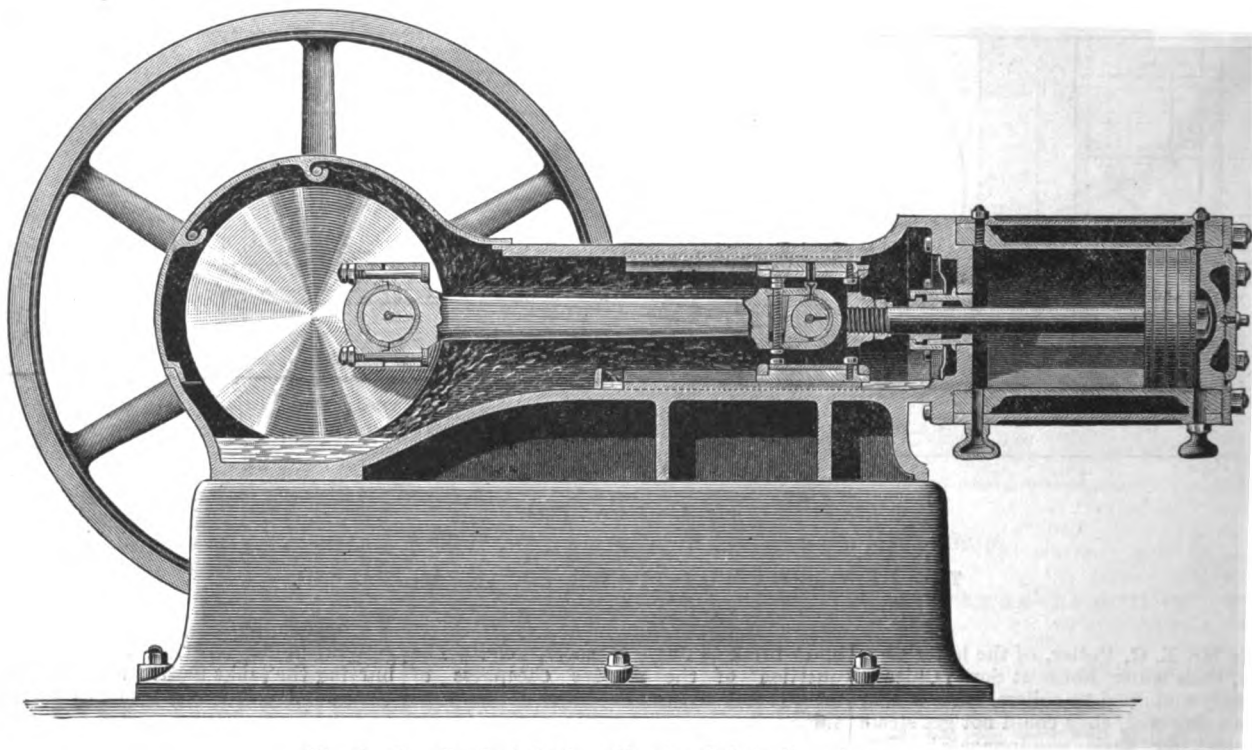


Fig. 2.—Longitudinal Section, Showing Lubricating Arrangement.

THE IDEAL ENGINE, BUILT BY A. L. IDE & SON, SPRINGFIELD, ILL.

the cross section, Fig. 4, explain the method of automatic lubrication which has been adopted.

Continuous streams of oil flow through all bearings, which enables the engine to run months, if required, without stopping for adjustment, and dispenses with the constant attention and care which must be bestowed when oil cups are used. As the oil is used over and over continuously, and not thrown over the engine-room floor, it produces a saving of over three-

fourths of the oil ordinarily used, besides giving more perfect lubrication.

The crank-pin is large and made of hard tool steel, ground to gauge and forced in with hydraulic press under a pressure of 20 to 40 tons, according to the size of engine. The method of oiling the main bearings and crank is best shown in Fig. 4. It will be seen that an oil chamber is provided under the two crank-disks, which is supplied with enough oil to insure the

low. The centrifugal force carries it into the crank-pin, from which it escapes through two holes into the bearing. Thus it will be seen that the main bearings receive constant lubrication, while the lubrication of the crank-pin is insured by the supply of oil from each side. This method of lubrication is constant and perfect, and provides for the most important bearings about the engine. Sufficient oil is placed in the basin under the crank disks, so it will flow in streams through both pipes

to main shaft bearings and in drops to the eccentric, but valves are provided on the pipes, so that the supply can be regulated as desired, and the oil-chamber or basin can be supplied with fresh oil while the engine is running. The oil from this chamber can be drawn off by a cock in end of frame communicating with the pocket and used over again. Besides the saving in oil these devices keep a clean and presentable engine and engine-room.

The governor, shown in Fig. 3 in position in the fly-wheel, is simple in construction. All its parts are in sight, and are readily accessible for cleaning. It is secured to the side of the fly-wheel, and connects through the eccentric on the main shaft direct to the valve without the use of gearing, pulleys, shafts or belts. It is attached to the valve direct, and gives an open port at the beginning of each stroke, and varies the point of cut-off as the resistance requires from the beginning to three-fourths of each stroke. It acts instantly, and cuts off the steam at a

cents, and 12-inch, 31 cents, and the Bethlehem Iron Company, 8-inch, 24 cents; 10-inch, 26½ cents, and 12-inch 27½ cents. There is an appropriation of \$1,455,000 for this purpose.

The British Belted Cruiser Australia.

The London *Engineer* illustrates in a recent issue the latest addition to the British navy, the belted cruiser Australia, a sister ship to the Galatea. Both vessels, built and engined by Messrs. R. Napier & Sons, Glasgow, belong to the class of swift and powerfully armed belted cruisers specially designed for the protection of commerce. Their principal dimensions are: Length between perpendiculars, 300 feet; breadth, extreme, 56 feet; depth, molded, 37 feet; with a displacement of 5000 tons at 19 feet draft when in the normal fighting condition, but this may be increased to 6000 tons when an extra supply of coal is

ward and aft respectively; ten 6-inch guns similarly mounted on the broadside; eight 6-pounder and eight 8-pounder quick firing guns, also six torpedo tubes. The engines, which were designed by Mr. A. C. Kirk, the senior partner of Messrs. Napier's firm, were originally specified by the Admiralty to be of the ordinary compound type for 7500 horse-power; but from their previous experience Messrs. Napier were able to show that by substituting triple-expansion engines they could guarantee an increase of 1000 horse-power, and almost a knot more speed, thereby enormously increasing the value of the ship as a fighting machine, without adding to the total weight of machinery and coal, or occupying more space. This suggestion was eventually adopted by the Admiralty and also carried out in the other ships of the class.

Two sets of engines are of the three-crank horizontal type, working twin screws, and are placed one before the other in separate water-tight compart-

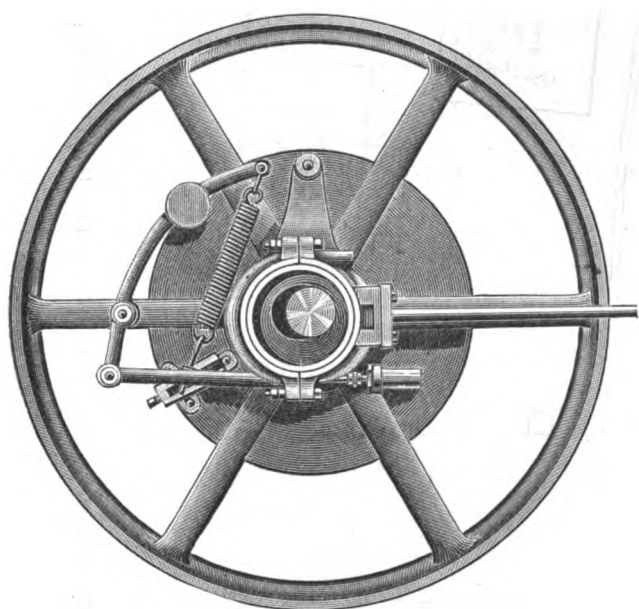


Fig. 3.—Enlarged View of Governor.

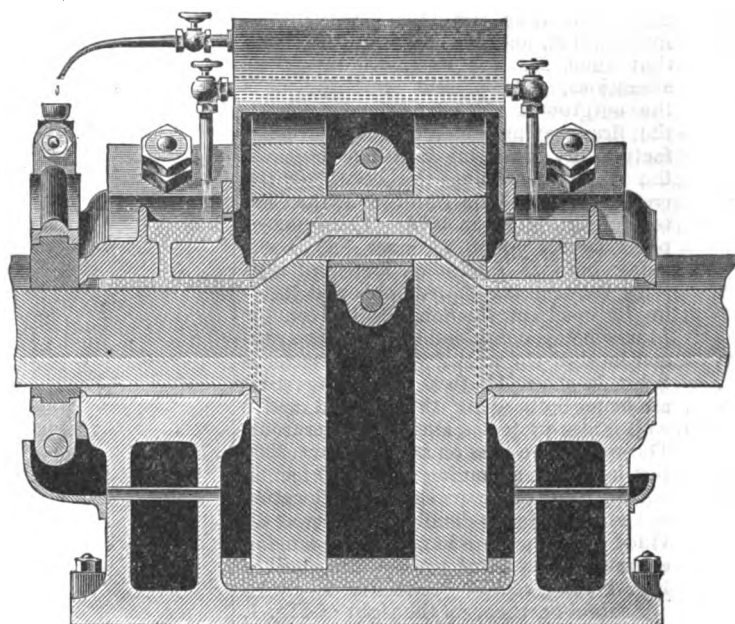


Fig. 4.—Section through Center of Main Shaft and Crank Pin, Showing Lubricating Devices.

THE IDEAL ENGINE, BUILT BY A. L. IDE, & SON, SPRINGFIELD, ILL.

point that will just do the work and maintain the fixed speed of the engine. The variation of speed from no load to the full power of the engine is claimed to be less than 1 per cent. The dash-pot attached to the eccentric controls the movement of the weight, preventing any sudden movement or jumping of the weight when a great change of load occurs suddenly. The speed of the engine may be changed to suit requirements by shifting the weight.

Safety caps are fitted to the cylinder, as in the older design of Ide engine, to prevent breakage of the cylinder heads due to accumulation of water of condensation. The valve-chest, however, is mounted at the side of the cylinder instead of at the bottom. The safety caps when broken can be easily and quickly replaced.

Bids were opened 20th inst. in the office of Chief of Ordnance of the Army, in Washington, for supplying complete sets of rough-finished, oil-tempered and annealed steel forgings, of American manufacture, for 8-inch, 10-inch and 12-inch guns. The bids were as follows: The Midvale Steel Company, Philadelphia, for the 8-inch, 29 cents a pound; 10-inch, 30

shipped. The belt which protects the water line for two-thirds of the length consists of steel-faced compound armor 10 inches thick, strongly supported by steel and teakwood backing, and terminates at each end in an athwartship iron bulkhead 16 inches thick to stop end-on shot. Level with the top of the armor belt is a protective steel deck 2 inches thick on the flat and 3 inches on the angle where it slopes down below the water-line, and this deck also extends to the stem and stern respectively. All the machinery of vital importance, including the steering gear, air compressors, electric dynamos, &c., is placed under the protective deck, while above it, for the length of the engine and boiler-rooms, the sides are defended by coal, and an armor-plated conning tower on the upper deck is fitted with steering gear, telegraphs, &c., for working the ship when in action. While every precaution is thus taken to keep out shot and shell, the buoyancy in case of penetration is insured by the minute subdivision of the under-water portion of the hull, which contains upward of 130 separate water-tight cells and compartments. The armament consists of two long range 22-ton breech-loading guns and central pivot mountings on the upper deck, for-

ments, the cylinders being 36 inches + 51 inches + 77 inches x 44 inches, and steam is supplied by four double-ended boilers of the return-tube type, which are placed forward of the engines in two independent stokeholds divided by water-tight bulkheads. The results of the official trials were highly satisfactory. In the case of the Galatea the collective horse-power on the four hours' forced-draft trial was 9204, being more than 700 horse-power in excess of the contract; the highest power developed during any single half-hour was 9665 horses, and the mean of the last three hours gave 9415, equal to 1915 indicated horse-power above what was originally proposed by the Admiralty. This result was attained on a consumption of 1.97 pounds of coal per indicated horse-power per hour with an air pressure in the stokeholds of only 1½ inches.

Reform in Bills of Lading.—The Boston Executive Business Association, at a meeting lately held, adopted the following resolutions: "Resolved, That in the opinion of this association it is the duty of common carriers to issue bills of lading for the goods received for transportation, and to deliver the goods and quantity receipted for or pay for the deficiency with-

out subjecting the receiver to the expense of litigation. *Resolved*, That we believe and insist that all merchandise should be delivered to the receiver on payment of the freight specified in the bill of lading. *Resolved*, That we heartily approve of the action of the Classification Committee of the New England railways in eliminating from their classification and tariff 'owner's risk,' and we strenuously urge the adoption of the same by all common carriers."

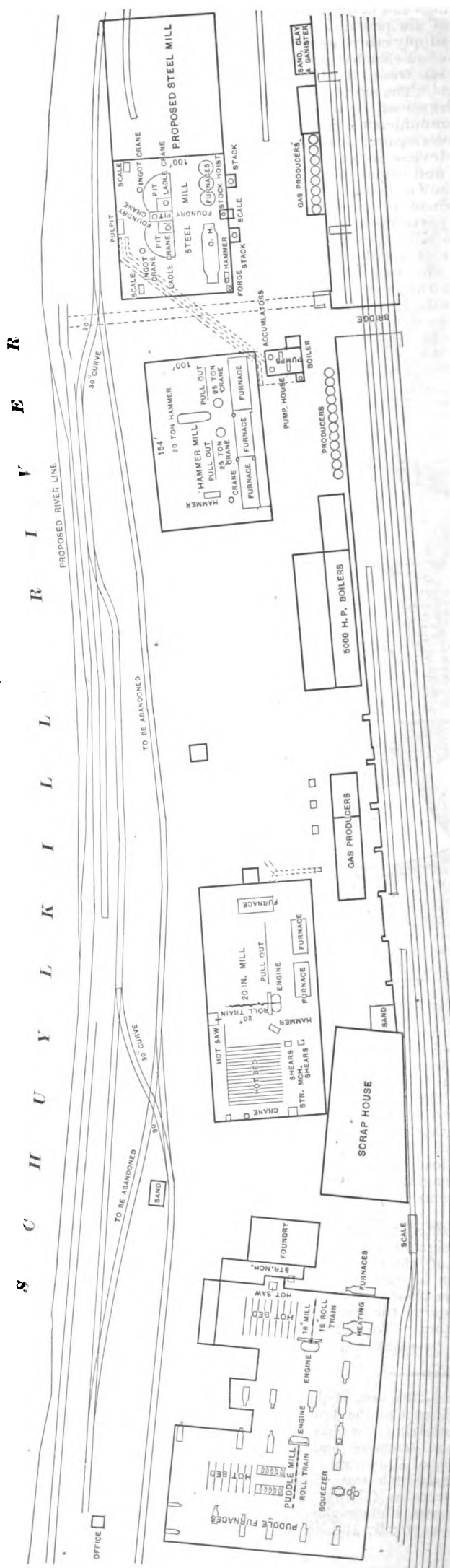
The Pencoyd Iron Works.

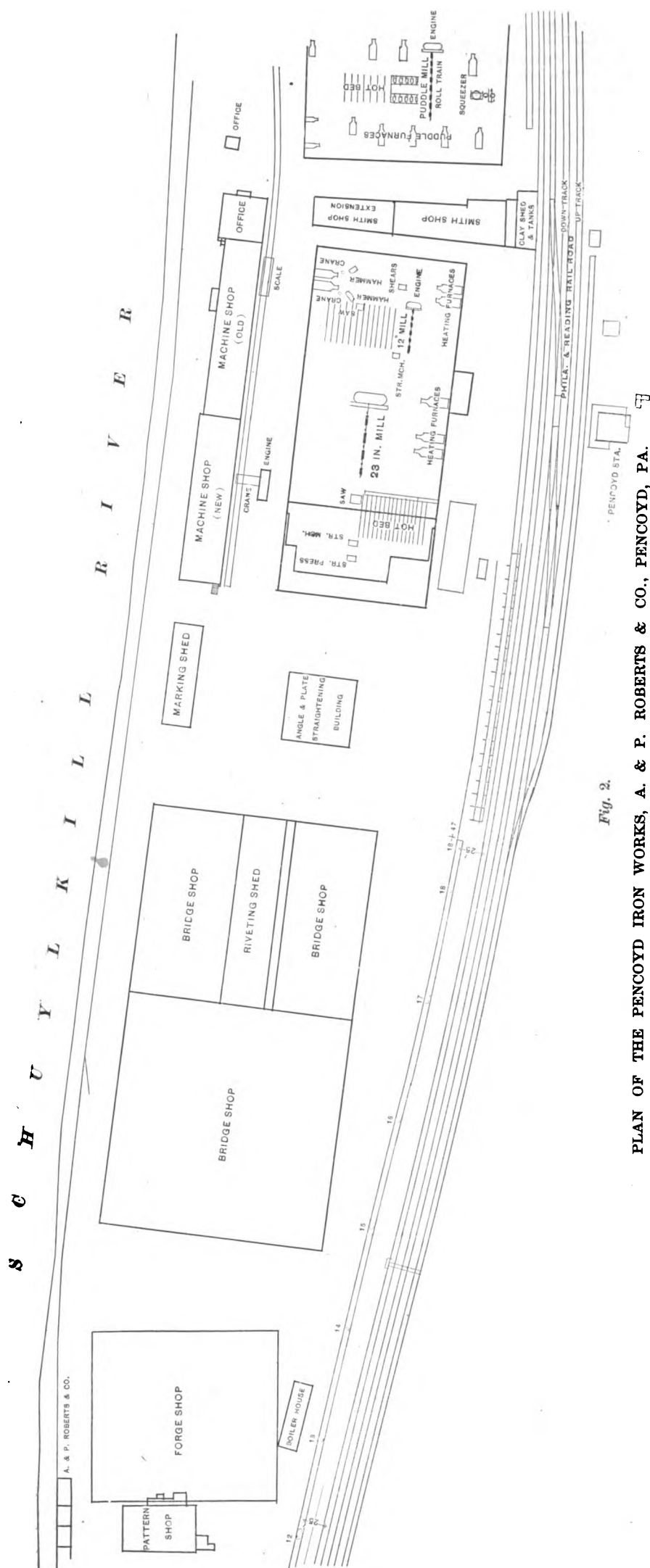
During a recent visit to the Pencoyd Iron Works of A. & P. Roberts & Co., situated on the Philadelphia and Reading Railroad, at Pencoyd, on the Schuylkill River, in Montgomery County, Pa., we had occasion to observe the important improvements now going on at that establishment, and obtained some data concerning the extensive plant for future enlargement, now being developed. The Pencoyd Works themselves were built in 1854, and the old puddle mill itself has since that time run almost without an interruption, and has never called, in all that time, for any extensive repairs or alterations. The present establishment is the outgrowth of that earlier enterprise, the firm having entered into the manufacture of structural iron and beams as the result of taking the order for the erection of the Main Building at the Centennial Exhibition in 1876. The Pencoyd plant covers about 25 acres, the works being built *en échelon* on a strip of land lying between the Philadelphia and Reading Railroad and the Schuylkill River, the former being considerably above the general level of the works, while the latter is below it about 15 feet. Retaining walls are being built along the railroad and a wall is also projected along the river front. The works are thus on a strip about 2900 feet long, and averaging about 350 feet in width. In order to show the location of the buildings in detail the plan was divided into two parts in our accompanying engravings, a part of the puddling mill in Fig. 1 being reproduced in Fig. 2.

Beginning, then, on the right of Fig. 1, we enter first the steel works. In the year 1886 the Pencoyd Works decided to add a steel plant to their establishment, putting up a 20-ton Richmond & Potts open hearth steel furnace, the gas being supplied by eight circular producers located immediately below the railroad track. Later, a new 12-ton furnace, with circular hearth 8½ feet in diameter, with water-cooled doors and flues, circular regenerators and removable roof for regenerators and furnace, was put in. The furnace is of special design, with an improved reversing gear, which in many respects departs radically from the usually accepted type of this class. The old furnace has been torn down, and a second furnace, of the same type as the new one, is generally put in its place. Bottom casting is being applied.

Between the two furnaces will be a large pit for making heavy castings from both furnaces, if necessary, while in front of each furnace is a semi-circular pit. When completed, the shop will have two ladle cranes, two ingot cranes, and one crane in connection with the foundry pit. Parts of one of the new cranes, built by the I. P. Morris Company, are now on the ground. The older ladle crane and the two ingot cranes are by the Morgan Engineering Company.

Immediately adjoining the open-hearth melting department a new building, 154 x 100 feet, has gone up, which contains a 20-ton hammer. It is of wrought iron exclusively, with the exception of the guides. To make the foundation for the large hammer the excavations were carried down to the solid rock, which was covered with 2 feet of Portland cement concrete,





PLAN OF THE PENCOYD IRON WORKS, A. & P. ROBERTS & CO., PENCOYD, PA.

and then the foundations were carried up of cut stone, a free space of 5 inches being left between the foundations of each leg of the hammer and the foundation of the anvil, the entire depth of the foundation being about 25 feet, and being anchored by 12 3-inch bolts. A manhole gives access to the latter. The anvil has a total height of 11 feet 8 inches, and has a total weight of 421,155 pounds, distributed as follows:

	Pounds.
Two blocks of 49,600 pounds.....	99,200
" " 52,600 "	105,200
" " 54,200 "	108,400
One " 54,300 "	54,300
One steel block.....	18,600
One anvil-die.....	8,100
Six wrought-iron bands.....	2,160
Four " bolts.....	3,080
Lead between anvil and timber.....	5,700
Zinc between blocks—1st course.....	8,313
" " " 2d "	5,122
" " " 3d "	2,012
" " " 4th "	1,018
Total.....	421,155

The base of the anvil is 11 feet 10 inches by 15 feet 2 inches. The hammer, which was built by the Maerkische Maschinenbau Anstalt, has a diameter of 1100 mm. and a stroke of 2510 mm., the total height being 10.118 m., the falling weight being 40,000 pounds. The hammer is served by two 20-ton cranes with a hydraulic pressure of 700 pounds. They are able to handle 20 tons each, the diameter of the hydraulic cylinder, which is attached to the mast, being 25 inches, with 11 foot 8 inch stroke. The trolley ram is 6½ inches in diameter, with 12½ foot stroke, while one ram 8 inches in diameter, and 2½ foot stroke, through rack and pinion, revolves the crane. The mast is one of the heaviest wrought-iron forgings made in this country, being 18 feet long. The hammer shop contains three re-heating furnaces, one with a hearth 13 x 7 feet 9 inches for two 10-ton ingots, a second, 20 x 6½ feet, for two 8-ton ingots, and the third, 20 feet 9 inches by 5 feet 8 inches, for twelve 1-ton ingots. They are served by hydraulic cranes built at Pencoyd, and a hydraulic arrangement is also to be put in for withdrawing the ingots. In the same hammer shop are to be two 8-ton axle hammers and one 5-ton hammer is also contemplated for forging. A new producer plant has been built for the hammer forge and other furnaces.

At the time of our visit a new boiler-house was being built, 123 x 50 feet and 40 feet high, the contracted space making it necessary to build it in two stories immediately in front of the retaining wall of the railroad track, which thus affords excellent facilities for handling the coal cheaply. Into this house 5000 horse-power of Babcock & Wilcox boilers are being put, and a number of economizers are also to be added. The stack being built in connection with it is to be carried up 30 feet with stone and 125 feet with ironwork, the total height being 155 feet and the diameter 10 feet in the clear.

Following the hammer shop is a 20-inch blooming mill, with three heating furnaces and a small temporary hammer for cutting up the billets. On this mill are also rolled angles, for which a straightening machine is provided, channels up to 5 inches, beams up to 6 inches and 6-inch rounds. The mill is driven by a 32 x 48 vertical engine.

Then follows, in the puddle mill, an 18-inch mill, rolling plates from 8 inches down to 2½ inches, rounds from 6 inches down to 1½ inches, angles from 4 x 3 inches to 3 x 3 inches and tees from 5 x 2½ inches to 3 x 2½ inches. The puddle mill contains 16 double and 1 single puddling furnace, with the puddle train, squeezer, hot-bed, &c. The works are equipped also with three axle hammers, one 3000 pounds, one 5000 and one 6000 pounds. In the finishing mills are a 12-

inch mill and a 23-inch beam mill, with their complement of heating furnaces, shears, hot-beds, saws, straightening machines, &c. The 23-inch mill makes up to 15-inch beams and channels. Running parallel to the finishing mills are two machine shops, well equipped with modern tools. Further on the bridge shop is reached, the old shop having been 200 x 375 feet. This year the large new shop has been added, shown in our engraving as the adjoining large square. This is an exceedingly handsome structure of great span, the roof trusses being designed to take a load of 10 tons at any one point. In the bridge shop, at the time of our visit, two pneumatic riveters of the Allen type were being used, while a heavy stationary hydraulic riveter was temporarily placed in a special building.

Power Dumping Apparatus.

We illustrate a power dumping apparatus designed by Mr. W. R. Jenkins, of the firm of Jenkins & Single, of Bellefonte, Pa., for the Scotia ore mines of Messrs. Carnegie Bros. & Co. The object was to overcome the objections to the "dump" or "tipple" in ordinary use. Since its erection about one year ago it has been in constant use, and is in every way satisfactory.

The cradle dump as usually built is designed so that when a loaded car is on it the center of gravity is above the center of the tippie, so that it will turn of its own accord and dump the contents of the car. The result is that the load is discharged in an almost unbroken mass. This is in many cases very objectionable, as for instance when discharging the contents into a pair of rolls to be crushed, or as in the case for which the arrangement shown was designed, the dumping of the contents into a washer in order to separate iron ore from the clay, &c.; or the dumping of coal with the least breakage of the lumps. In any of these cases it is desirable that the "material" be discharged gradually, and that it be under control of the operator, who can, so to speak, feed the contents of the car into the receptacle as fast as he desires. In the case of the cradle operated by gravity it may be well to explain that after the car is turned upside down and emptied the center of gravity is again above the center of the tippie, and it is brought back into position automatically by gravity. At least that is the intention, but in practice it is a matter of hard work to assist in turning either in one direction or the other. The application of power to a dump of this kind, so far as we are aware, is novel, and the result eminently satisfactory.

The tippie used is what is commonly known as the cradle dump, one end of which next to the circular rail is hooped with plate-iron, about 10 inches wide. To this is attached a chain, the other end being fastened to the drum A in the operating mechanism, which in this instance was placed overhead, and is driven by a belt on the pulley B. On the same shaft with the pulley B is a small paper friction pulley C. An intermediate shaft D has on one end a large iron friction pulley E, and also on the same shaft is a small spur pinion gearing into a spur wheel on the drum shaft. The end of the shaft D is carried by a pillow block, G, which is capable of being moved back and forth, to permit of the friction pulley E being thrown into and out of contact with the pulley C, and also against the stationary brake-block H. This movable pillow-block is operated by means of a lever, as shown. In operation, when a loaded car is run into the tippie, the friction pulleys are brought into contact and the drum set in motion, winding up the chain and slowly turning the cradle until the car is

upside down. If necessary at any time, the frictions can be released and the pulley brought back against the brake-block and the car held stationary in any position. In this manner the operation of dumping can be prolonged to any length of time desired. On releasing the friction device,

shaft. The material is dumped into steel crushing rolls, 4 feet diameter, falling from them into the washers.

The Union Pipe Mill Company, of Pittsburgh, with a capital stock of \$25,000,

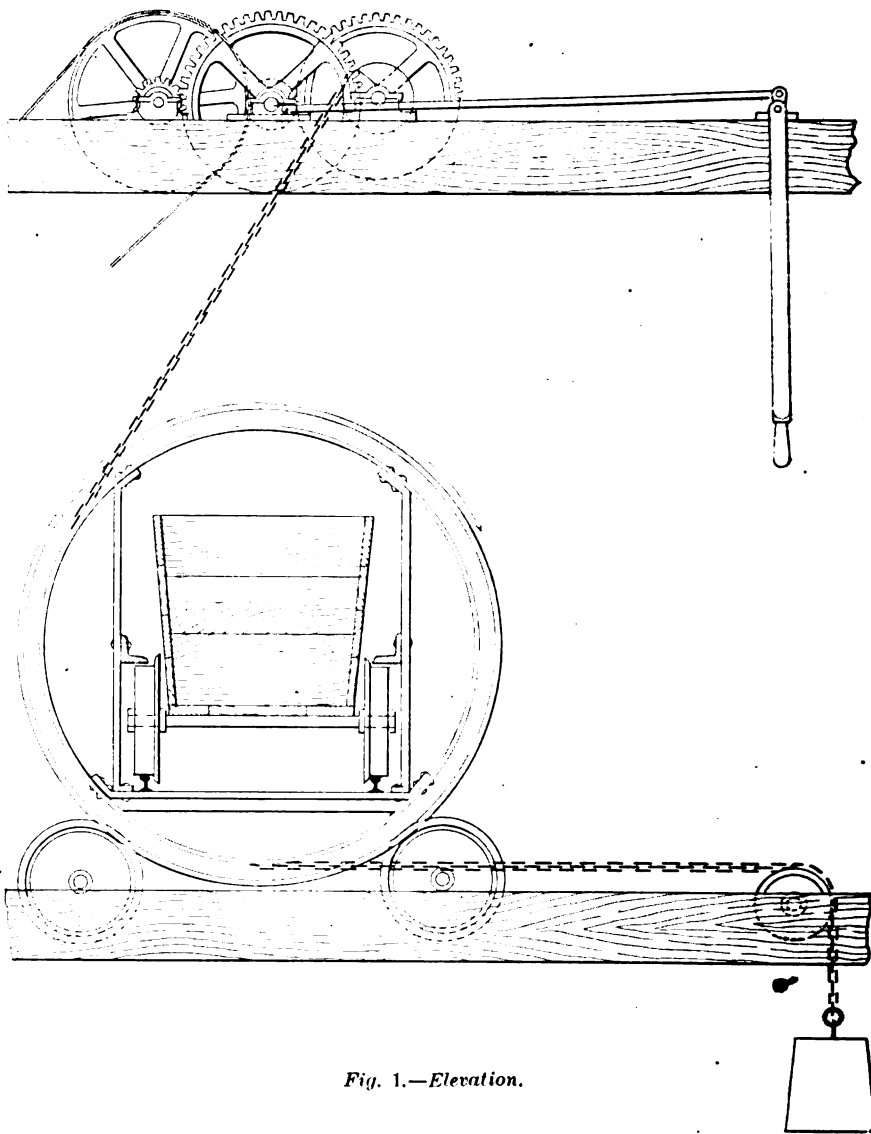


Fig. 1.—Elevation.

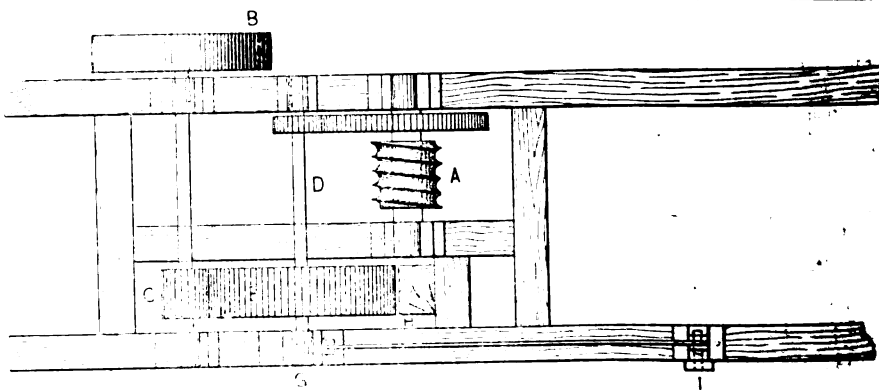


Fig. 2.—Plan of Overhead Pulley Arrangement.

POWER DUMPING APPARATUS, MADE BY JENKINS & SINGLE,
BELLEFONTE, PA.

the cradle is brought back into its original position by means of the counterweight O. The gearing was in this case speeded to make one-half a revolution of the tippie in about 15 seconds. The cars had a capacity of about 30 cubic feet, and were filled at the mines by a steam excavator, two tipples being used, having a combined capacity of 120 cars per hour. Both tipples are operated by the same driving

was chartered last week. The stockholders are James J. Brown, B. Brown, R. J. Brown, Joseph Brown and Hugh McElroy.

The breakwater at Cleveland harbor will be extended 600 feet, at a cost of \$70,000. The ironwork will be done by Andrew La Cour, of Cleveland, and the construction by Jas. B. Donnelly, of Oswego.

THE WEEK.

Although the exports of petroleum from the United States are decreasing in quantity by reason of Russian competition they are not declining in value. The report of the Bureau of Statistics shows that during the eleven months ended November 30, 1888, 506,153,493 gallons of petroleum were exported, at the value of \$42,549,492. In the corresponding period of 1887 the petroleum exports amounted to 530,571,678 gallons, of the value of \$41,246,286. Thus, compared with the petroleum traffic of 1887, 24,418,185 gallons less in 1888 brought \$1,303,226 more.

The lower end of New York City, more particularly Wall street, Broadway, and the region contiguous, is undergoing a complete architectural change. The metamorphosis is so radical that within the last ten years the district referred to has almost passed recognition. The latest movement is the purchase by the Union Trust Company of the buildings at 78, 80 and 82 Broadway, near Wall street, for \$1,200,000, with the design of erecting on the site a splendid structure for their own use and for general office purposes. It is also reported that the five buildings on the southwest corner of Wall and Broad streets, opposite the Drexel Building, are to be torn down this spring and an office building erected at a cost of upward of \$1,000,000.

By advancing several million dollars of her own money Miss Mary Garrett, daughter of the ex-president of the Baltimore and Ohio Railroad, has recovered that property from the control of the bankers who had advanced \$500,000 in furtherance of the plans of Samuel Spencer, who is now succeeded by Chas. F. Mayer, of Baltimore, and it is stated that the policy of the road will now be an aggressive one, that an independent route to New York will be established, and the Staten Island terminal work pushed with vigor.

Leading Pittsburgh manufacturers, among whom are B. F. Jones, J. W. Chalfant, M. K. Moorhead, Jas. Loughlin, Jr. and W. C. Quincy, are forming a dock company to build docks on Lake Erie at Cleveland and Ashtabula, to facilitate the handling of ore. In the same line of enterprise are three large docks to be built at West Superior, one of which will be the largest coal docks on the chain of lakes. Another is for the Ohio Coal Company, and a third for the Eastern Minnesota Railway Company.

Canadian financial institutions have over \$23,000,000 loaned in the New York market, much of which represents the proceeds of a loan placed by Canada upon the London market last July. The refusal of the Government to make a \$1,000,000 loan direct to the city of Toronto causes much complaint.

Plans for the improvement of the East River from Grand street to Thirty-fourth street, for the better accommodation of the Sound steamboats, have been presented to the Sinking Fund Commissioners from the Dock Board and approved. A margin street 175 wide and a new bulkhead line are proposed. The entire estimated cost \$10,000,000.

The growing importance of New York City, which Congressman Cox says will have 8,000,000 inhabitants 50 years hence, including the suburbs, is assigned as a reason for liberal appropriations for the improvement of its harbor. "At this magnificent port," said Mr. Cox, "with its two entrances—East River into Long Island Sound and thence to the sea, and through New York Harbor via Sandy Hook to the ocean, New York imports two-thirds of the merchan-

dise of our country, receives two-thirds of the import duties for our Government, sends out one-half of the domestic products of the country and gives hospitality to one-half of the foreign tonnage trade with the United States. Three-fourths of the passengers who come from and go to foreign countries, including three-fifths of all immigrants, find their grand depot at New York harbor. While it is admitted that New York has so large a preponderance of our commerce, with its exports and imports, the appropriation for the care of its harbor is grotesquely inadequate. This bill, which appropriates \$12,000,000, gives \$100,000 for New York harbor, \$20,000 for Gowanus Bay, \$150,000 for the Harlem improvement and \$175,000 for the East River and Hell Gate, hardly \$500,000."

The Merchants' Bridge and Merchants' Bridge Terminal Company have received bids from the King Bridge Company, of Cleveland, the Union, of New York, and the American. Under the best bid, which, it is said, was accepted, the bridge complete will cost \$1,200,000 and the terminals an additional \$300,000. The bridge will consist of three spans, averaging 522 feet, and two approaches, each about 425 feet long, the entire length being a little short of a half mile.

Bids for an armed coast defense vessel of 4000 tons, to be of materials wholly American, will be opened by the Navy Department February 1.

The remedy prescribed for rate-cutting in railroad transportation is to put men who are both honest and capable in control of our great corporations.

Prominent real-estate experts and dealers in New York City have employed engineers, who are engaged in determining the cost of a stupendous scheme for an arcade, or tunnel, designed to provide a thoroughfare on the West Side to remedy the long-block nuisance. The distance between the principal avenues averages about 900 feet, and it is proposed to divide the blocks by opening an arcade for foot passengers only over a railroad tunnel, or, as an alternative, to open a thoroughfare for light vehicles, open to the sky, except in business sections, where galleries could be introduced along the several stores facing the street, under a glass roof. The expenditure would be mainly in the excavation for the tunnel and construction of buildings appropriate to each neighborhood. In the residence portions the arcade or thoroughfare would need be but a story high, admitting of the occupation of all of the space above the tunnel but the first story for dwellings. In the retail sections the arcade might be 50 feet wide, or less, and would be lined with rows of neatly constructed buildings on either side, facing the arcade, and available for all kinds of retail stores, offices, &c. One plan is to interest the present owners of property in a large corporation as shareholders, or to carry out the scheme under the power of eminent domain.

Owners of property on the east side protest against the monopoly of the piers on the East River by rich corporations. The piers are being covered with sheds, forcing ships which have landed and receive cargoes there to find wharfage in Jersey City or Brooklyn.

Foreign vessels, according to the report of the Commissioners of Navigation, continue to crowd us out of the foreign trade, even in our own ports. British vessels pay the largest portion of the foreign tax. Norwegian and German sailing vessels and German and French steamships pay a good deal of the rest. The tax paid by vessels of the United States is less than a quarter of that paid by the British vessels, and the business done in our ports by the vessels

of each nationality is in about the same proportion. The figures giving the amount of tonnage tax collected from foreign vessels shows to what an alarming extent they are encroaching upon a trade that should be more largely ours.

Mr. Robertson, of New Brunswick, of Joggins raft notoriety, is endeavoring to form a syndicate to promote the new mode of transporting logs to market so that the waste timber may be utilized. There is about to be built on the Washington Territory coast a raft consisting of about 8,000,000 feet, whose destination is Valparaiso. Another will be sent to San Francisco for a mill on Socoleta Bay, which will be stocked entirely by rafts towed from Washington and Oregon Territories.

The Philadelphia police authorities charge that at least 150 fires in that city during the year were the work of professional "fire-bugs" whose headquarters are in New York City. The firm have agencies in all the principal cities, that their guise is generally that of a glazier, and that they are ready to start a fire to order, furnishing supplies of clothing when desired, on stipulated conditions, also the needed chemicals.

On two recent occasions, once at the lower end of Broadway, and again at the corner of Maiden Lane and Nassau street, the electrical subway has blown up with great force, destroying the pipes and iron castings. Electrician Wheeler, of the Board of Electrical Control, says that almost any underground system will work, viewed simply as an electrical channel. The problem is to get one that will protect the wires against illuminating and sewer gas. Co-operation of competent electrical experts in laying subways is the only security against constantly recurring explosions.

Engineer Gustav Lindenthal, the projector of the proposed high bridge over the Detroit River, has in contemplation a structure which would rank among the largest on the continent, with towers not less than 300 feet above the water, and the superstructure at least as high as that of the Brooklyn Bridge. The towers supporting the superstructure will be of steel, and will stand on stone piers which will be founded on rock nearly 100 feet deep. These foundations will be put down by the pneumatic method, the same that was used for the St. Louis and the Brooklyn bridges. The location of the piers will determine the cost of the bridge. The bridge company, Mr. Lindenthal says, consist of men of financial resources who can carry out what they undertake.

The German Export Society has decided to build the Floating Exhibition Palace of Germany, having raised 5,000,000 marks for the purpose. The plan is to sail from port to port showing the superiority of German wares. "International exhibitions," says the prospectus, "do not occur often enough, and must be supplemented in this way." The vessel is to be called the Kaiser Wilhelm, and will be the work of German shipyards, and upon a scale more magnificent than that of any craft afloat. According to plans the ship will be 172 m. long, 20 wide and 14 high. It will have four engines propelling as many screws. The material will be principally German steel. The cost of a two years' tour is estimated at 3,150,000 marks. The income from the rented space—1000 to 1200 marks for each booth—and from sales will be, it is thought, at least 7,260,000 marks, leaving a balance of 4,110,800, or over 2,000,000 marks annually—a pretty sum on the pages of the ledger. Emperor William has promised his aid to the enterprise, and it is hoped that the vessel will sail from Hamburg on her first voyage in the spring of 1890.

MANUFACTURING

Iron and Steel.

Under date of the 19th inst. the Laughlin Nail Company, of Wheeling, W. Va., write us as follows: "During the greater part of November, and all of this month to date, we have been shipping at the rate of from 8 to 12 carloads of nails per day. Since the advance made on the 11th inst. we have had numerous inquiries, and have taken a good many orders at the new price. We are looking for still higher prices within another 30 days, and think that the outlook for spring business is very encouraging."

Under a decree of the United States Court the Commissioners in Chancery, in the case of the Fidelity Trust Insurance and Safe Deposit Company, of Philadelphia, against the Shenandoah Iron Company, in Page County, Va., have advertised to sell, on January 8, the works and personal property, 33,000 acres of mineral lands, 3 mansions and 77 tenant houses. The debt against the company is over \$800,000.

The rolling mill of the Straight Fibre Iron Company, at Stewart avenue and Fortieth street, Chicago, was burned on the evening of the 18th inst. The flames first appeared on the roof over one of the puddling furnaces, just after the night turn had gone to work. The mill hose was immediately put into service and the fire would have been extinguished easily, but a coupling broke, causing delay and giving the flames the mastery. The city engines did not arrive in time to save the structure, which was wholly built of wood, but they prevented the fire from communicating to the buildings of the Chicago Forge and Bolt Company, standing in dangerous proximity. The greater part of the machinery and equipment of the plant has not been seriously damaged, and as soon as the insurance is satisfactorily adjusted the works will be rebuilt. As the loss is well covered by insurance the company will not suffer financially from that cause directly, but the stoppage of the works comes most inopportunistly, as the company had received orders which would have kept them employed up to their full capacity for months. A rough estimate places the damage to the property at \$50,000.

Martel Furnace, of the Martel Furnace Company, at St. Ignace, Mich., has been blown out for the purpose of repairs. A new hearth will also be added. The furnace will remain idle until spring on account of the difficulty experienced in shipping iron during the winter months.

Raney & Berger, of New Castle, Pa., proprietors of the Raney & Berger blast furnace at that place, have made a contract with J. P. Witherow, of Pittsburgh, for the erection of a new stack, 23 feet bosh and 80 feet in height, and a tower hoist of wrought iron attached, to be used as a spare stack. It is not the intention of the firm to operate more than one stack at the same time.

The Lewis Foundry and Machine Company, Limited, of Pittsburgh, are engaged in the erection of a 12-inch merchant train, together with the engine and rolls, for the Horseshoe Machine Company, of Anniston, Ala.

The work of relining Grace Furnace, of the Brier Hill Iron and Coal Company, at Youngstown, Ohio, which was commenced on the first day of the present month, is expected to be completed and the furnace ready for blast on January 1 next.

We are informed, on good authority, that the Bessemer converting department of the new plant of the Allegheny Bessemer

Steel Company at Duquesne, Pa., will commence operating shortly after the 1st of January next. In this way a stock of blooms will be secured ready for use for rolling into rails as soon as that department commences operations, which will probably be in March next.

On the morning of the 14th inst. a fire broke out in the Soho Iron Mills, of the Moorhead-McCleane Company, at Pittsburgh. The main building escaped injury, but the foundry and machine-shop were considerably damaged. The loss was not large, and was fully covered by insurance.

On Wednesday, the 19th inst., there was rolled in the armor-plate mill of the Homestead Steel Works of Carnegie, Phipps & Co., Limited, at Homestead, Pa., a shaft 20 x 20 inches in diameter and weighing 26,500 pounds. This one is even more remarkable than the other large shafts rolled in this mill a few days ago, since it required 2 x 4 inches more reduction from the same sized ingot—an octagon 40 inches in diameter.

The Bessemer steel department of the Bellaire Nail Works, at Bellaire, Ohio, turned out 6560 tons of finished steel during the month of November. The blast furnace of this company during the same month turned out 3914 tons of Bessemer pig iron.

Rosena Furnace, at New Castle, Pa., operated under lease by Oliver Bros. & Phillips, of Pittsburgh, for the week ending Saturday, December 8, turned out 1122 tons of iron. This is the largest output of the furnace in the time given since it was erected.

From the Steelton, (Pa.) Reporter of the 22d inst., we take the following information regarding operations at the plant of the Pennsylvania Steel Company, located at that place: "No. 2 Bessemer made a heavy run all week, averaging 900 tons of ingots every 24 hours. No. 1 open-hearth has both furnaces in operation on special steel. 1 large punion and several gear-wheels were cast during the week. No. 1 blooming mill made a medium run. No. 2 had one turn on nail plate and the other on rail steel for the merchant mill. The hammers were on special steels, partly for cruisers. The universal mill was on heavy slabs for structural purposes. The rail mill made a light run and was on 85s, sec. 67, all week. The merchant mill was rolling rails and billets on the 20-inch train and small sizes and shapes on the 13-inch train. The frog, switch and signal department is very busy, running night and day, with plenty of orders. The foundry cast a number of gas retorts for shipment. A number of molds are in preparation for bells and other heavy work which will be cast next week. The machine shop is busy on new work and the boiler shops, blacksmiths and pattern makers are similarly employed.

Notices have been posted at the Edgar Thomson Steel Works of Carnegie Brothers & Co., Limited, at Braddock, Pa., that the wages for December will be paid on the basis of rails at \$28.50 per ton.

Swede Furnace, at Swedeland, Pa., operated by R. Heckscher & Sons, under the superintendence of Albert Walters, has beaten its own record, making 515 tons of pig iron last week.

The American Wire Nail Company, of Coryington, Ky., who are building a new rod mill at Anderson, Ind., have contracted with Alex. Loughlin & Co., engineers and contractors, Cleveland, Ohio, for two natural gas heating furnaces of the same size and capacity as those now in use at the rod mill of the Joliet Steel Company, at Joliet, Ill. These furnaces re-

cently turned out 777 tons of finished No. 5 rods in one week, which, it is claimed, beats the record for two furnaces with working hearth 7 feet by 18 feet.

Machinery.

The Kilby Mfg. Company, Cleveland, are running night and day upon heavy work for paper mills and cable roads. One digester for paper stock is made of lead bronze, 7 feet in diameter, 22 feet long, and weighs 30,000 pounds. It is cast in five sections. The cable road work goes to the Pacific coast, and one order will make 65 carloads.

The American Brake Company (Westinghouse Air Brake Company, lessee), of St. Louis, have undertaken the improvement of their works on a large scale, and at an estimated cost of about \$25,000, accounting for both additional machinery and new buildings. The new steam plant and machinery ordered by the company embrace the following: 125 horse-power Babcock & Wilcox boiler, with the Verona automatic stoker; two new Westinghouse engines, one of 65 horse-power for the machine shop, and the other, of 35 horse-power, for the blacksmith shop; large steam hammers, including a 1500 pound Bement & Miles hammer; a drill press that will perform the remarkable feat of running two 4-inch twist drills at the same time through iron or steel; six-spindle drill press; 2-inch bolt cutter; new furnaces, &c.

Hardware.

Wiley & Russell Mfg. Company, Greenfield, Mass., have recently completed a fire-proof building to be used as a depository for stock. Makers of taps and dies find it necessary to carry a great variety of these tools in stock, and thousands of small bins, neatly arranged in a room 40 x 50 feet, contain the various sizes, shades of sizes, shapes and number of threads kept on hand by this company.

The McCosh Iron and Steel Company, of Burlington, Iowa, are erecting a wire-drawing plant. It will consist of 50 blocks, and will manufacture wire for their barb wire and wire nail machines. A 250 horse-power engine, built by the Murray Iron Works, of the same city, will furnish power.

The American Steel Screw Company, with a capital stock of \$1,000,000, was incorporated at Lima, Ohio, on the 18th inst. The company is composed of New York, Chicago, Cincinnati, and a few home capitalists. The company has purchased ground and will commence the construction of buildings at once. Employment will be given to 1000 men.

The factory of the Putnam Wire Nail Company, Greencastle, Ind., was destroyed by fire on the 15th. The loss was about \$11,000, the insurance being \$6300. The company have not yet decided whether to rebuild or not.

Whitfield & Jacobs, Pontiac, Mich., report large orders for their Buckell safety levis, which is being taken hold of by the jobbers.

M. Bare, Hamilton, Ohio, has sold the entire equipment, including machinery, patterns, dies, &c., of his hoe manufactory to the Chattanooga Tool Company, Chattanooga, Tenn., who have moved the machinery to their city, where they will manufacture the full line of hoes and rakes formerly made at Hamilton. They have also, they advise us, brought the skilled labor that operated Mr. Bare's factory to their works at Chattanooga, thereby securing greatly increased facilities for making their old line of handled hoes, drain cleaners and neck yokes, as well as the complete line of rakes and eye hoes made by Mr. Bare.

The wire-nail factory of the Hartman Steel Company, Limited, at Beaver Falls, Pa., which has been idle for some weeks, resumed operations on double turn on the morning of the 18th inst. The wire mill department of this firm, which has been idle for two months, has partially resumed operations, and preparations are being made to operate it to its full capacity after the first of the year.

C. H. Amidon, late Amidon & Bastedo, has removed his works from their former location, on Main street, Buffalo, to 1451 Niagara street, occupying the entire upper half (second story) of the Josiah Rose Iron Works plant. The present factory covers an area of 250 x 65 feet, which will be occupied in the manufacture of bit braces.

The incorporation of the American Steel Screw Company, with works at Lima, Ohio, is announced. It is intimated that the enterprise will be carried on on a large scale.

Joseph Churchyard's Sons, Buffalo, N. Y., have completed an addition to their factory. This addition was rendered necessary by the requirements of their refrigerator business, and they have now a brick building 56 x 112 feet, four stories, adjoining their main building. They have also put in a large-power elevator with a capacity of 80,000 pounds and have their entire plant equipped with automatic sprinklers as a safeguard against fire. They have, however, been extremely fortunate in this regard, as they have been located in their present quarters for 36 years and have never had a fire in the establishment.

Acme Shear Company, Bridgeport, Conn., have completed changes and additions to their factory, thus obtaining about double their former available floor space. They have purchased from the estate of E. C. Maltby & Son, Sheldon, Conn., the entire plant of machinery, tools, dies, patterns, &c., used by them in the manufacture of steel spoons and forks, and will continue the manufacture of this line at Bridgeport. They expect to be in shape to turn out some work by January 1, at latest, and to put the goods on the market in improved quality and finish.

The Lambert & Bishop Wire Fence Company, of Joliet, Ill., have added to their plant a new brick building, 160 x 50 feet, for storage purposes. They have also put in a new Corliss engine and a number of new barb-wire machines.

Under date of the 8th inst. the Lima Lock Mfg. Company, recently organized at Lima, Ohio, for the manufacture of door locks, knobs, and general builders' hardware, write us as follows: "This company will commence operations here on January 2, 1889, having several large buildings which will be arranged temporarily for our use. Some of the leading capitalists of this city are interested, as well as a few in New York. We start up with a large number of orders on hand. We have secured the patents, patterns and trade of an Eastern concern and will do a large business from the start, having ample capital at our command."

Miscellaneous.

The Aluminum Brass and Bronze Company, recently formed for the manufacture of aluminum and silicon sheets, rods and wire, under the exclusive rights in the United States of the Cowles patents, are erecting buildings covering 2 acres area at Bridgeport, Conn., which are expected to be ready in April next. The officers of the company are: F. J. Kingsbury, president; William Powe, treasurer; F. J. Kingsbury, Jr., secretary; Dr. Leonard Waldo, electrical engineer; Charles S.

Morse, mechanical superintendent; Mr. Kingsbury is also president of the Scoville Mfg. Company, Waterbury, and Mr. Powe was formerly connected with Ansonia Brass and Copper Company.

Gordon M. Richardson's wholesale tinware establishment, at 237 Lake street, Chicago, was damaged by fire on the 18th inst. The fire originated in the rear of the third floor from the effects of an overheated stove in the japanning room. The supports of the elevator machinery at the top of the building were weakened by the flames and it fell through to the second floor, causing much damage. The fire was extinguished before the building was completely destroyed. Mr. Richardson's loss will not exceed \$5000, which is fully covered by insurance.

Last week the Pittsburgh, Cincinnati and St. Louis Railroad Company let a contract for the building of 2000 freight cars, divided as follows: 1000 box cars to the Ohio Falls Car Company, at Jeffersonville, Ind., 500 stock cars to the Missouri Car Company, St. Louis, and 500 gondolas to the Peninsular Car Company, of Detroit.

The following corporations have recently been organized under the laws of Illinois: Chicago Car-Brake Company, capital \$200,000, to manufacture attachments; incorporators, J. N. Young, G. B. Quigg and Edward Lewis. Brownlev Brake Shoe Company, Chicago, capital \$200,000, to manufacture brake-shoe bushings and kindred appliances; incorporators, J. K. Allen, M. S. L. Rickey and L. P. Conover.

Coal and Modern Civilization.—Prof. J. S. Newberry, in a lecture on "Coal, the Dominant factor in Modern Civilization," recited the formation and history of coal, and then proceeded to show that, though ancient civilizations had progressed without its use, the period since the extensive use of coal has given the present age so great an impetus in industrial affairs that men would be reduced to the condition of the Dark Ages if they were suddenly deprived of its use. "It is estimated," he said, "that with the average engines now in use about 1,500,000 foot pounds are practically evolved from the combustion of a pound of coal and are available in the performance of any work done. In other words, the combustion of a ton of coal yields a power equivalent to that of six men and a well-grown boy throughout the year. In round numbers the annual production of coal in this country is now 100,000,000 tons; in Great Britain 160,000,000. This vast quantity of condensed force will be seen to be equivalent to 1,000,000,000 men working for a year. When we realize that all this is an element utterly wanting in the lives of the ancients, and that it has been almost entirely added to pre-existent agencies within the last hundred years, we must concede that it has been a most important factor in our material progress, and not without potent, we may almost say controlling, influence on the occupations, habits, manners, morals, and politics of those nations which have fallen heir to the most abundant supplies of this precious material."

The pontoon bridge over the Missouri River at Nebraska City is probably the longest in the world. Its length across the navigable channel is 1074 feet, while the back channel is traversed by a causeway 1050 feet long, supported on cribs. The charter for this bridge has been held for 12 years, because of the difficulty of obtaining financial support for a project which appeared so impracticable. It is stated that the entire bridge was built in 28 days, at a cost not exceeding \$18,000, by Col. S. N. Stewart, of Philadelphia, assisted by Gen. Lyman Banks, of Iowa. The draw

is V-shaped, with the apex down stream. It is operated by the current and controlled by one man. The clear span is 528 feet. The bridge was completed in August and is doing good service. It will be removed during the ice season.

The Population of the United States.

The total vote cast at the last Presidential election was 11,340,518, an increase of 2,136,090 over 1880. Assuming that the vote cast in 1888 bore the same relation to the total population as the vote of 1880 bore to the total population in the census year, it would appear that there has been a growth of 10,396,503 in eight years, and that a count of heads at the present time would show a population of 59,767,843 in the United States. It appears that the population in each State in 1880, and the apparent population in 1888, are as follows:

	Population in 1880.	Apparent pop. in 1888.
Alabama.....	1,282,505	1,541,583
Arkansas.....	802,525	1,089,952
California.....	864,694	1,299,428
Colorado.....	194,327	320,008
Connecticut.....	622,700	708,298
Delaware.....	146,608	145,956
Florida.....	269,493	346,392
Georgia.....	1,542,180	1,414,353
Illinois.....	3,077,871	3,662,916
Indiana.....	1,978,301	2,255,185
Iowa.....	1,624,615	2,020,650
Kansas.....	996,006	1,618,073
Kentucky.....	1,648,690	2,137,542
Louisiana.....	939,946	1,106,448
Maine.....	648,936	577,129
Maryland.....	934,943	1,144,368
Massachusetts.....	1,783,085	2,167,716
Michigan.....	1,636,937	2,186,186
Minnesota.....	780,773	1,280,217
Mississippi.....	1,131,597	1,112,584
Missouri.....	2,168,380	2,803,075
Nebraska.....	452,402	555,522
Nevada.....	62,266	41,609
New Hampshire.....	346,991	386,852
New Jersey.....	1,131,116	1,366,334
New York.....	5,032,871	6,079,732
North Carolina.....	1,399,750	1,675,225
Ohio.....	3,196,062	3,712,556
Oregon.....	174,768	259,799
Pennsylvania.....	4,282,891	4,785,189
Rhode Island.....	276,531	383,219
South Carolina.....	995,577	461,477
Tennessee.....	1,542,359	1,912,717
Texas.....	1,591,749	2,088,928
Vermont.....	332,286	379,671
Virginia.....	1,512,565	2,159,060
West Virginia.....	618,457	857,633
Wisconsin.....	1,315,497	1,729,461
Totals.....	49,371,340	59,767,843

Illinois has increased 585,045; Kansas, 611,977; Michigan, 549,249; Minnesota, 499,444; Missouri, 634,695; New York, 996,861; Ohio, 514,794; Pennsylvania, 502,298; Texas, 497,197, and Virginia, 646,495 souls. South Carolina shows an apparent decline of 534,100 inhabitants.

Southern Pig Iron Freight.—The Southern Railway and Steamship Association has issued a rate-sheet for January, making the rate to Chicago and Detroit from Birmingham, \$4.15; from Chattanooga, \$3.90, and from Sheffield, \$3.90; to Cincinnati, \$2.90, \$2.40 and \$2.65, respectively; to Cleveland, \$4.15, \$3.65 and \$3.90; to St. Louis, \$3.40, \$3.15 and \$2.95; to Kansas City, \$5.64, \$5.64 and \$5.19; to Louisville, \$2.65, \$2.40 and \$2.40, and to Pittsburgh, \$4.80, \$4.30 and \$4.55, respectively.

The Goulds, Austin and Caldwell Company have been incorporated at Chicago, with a capital of \$100,000. The incorporators are Frederick C. Austin, Robert W. Caldwell and Seabury S. Gould. The company will conduct a manufacturing business auxiliary to the business of the well-known firm of Goulds & Austin, of Chicago. As all the details of the new undertaking have not been completed further particulars are withheld until that is accomplished.

The Iron Age

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The Short-Haul Clause.

Judging from surface indications we may expect an effort to be made toward altering the Interstate Commerce law. The New York *Tribune* recently said: "There are signs that a radical change in the law will soon be demanded—not mere modifications of detail, but vital and far-reaching changes—which amount in the aggregate to a new and different system." One of the clauses of the present law to which grave objections are raised by our railway managers is the section forbidding a greater charge for a shorter than for a longer haul. It is to this that the railroads west of Chicago attribute much of the falling off of net earnings shown in their reports. But is this clause a direct cause of such losses? Rather let us say it is the effect of circumstances affecting the revenues of the company at once instead of slowly, as before.

To illustrate our meaning let us take the several roads between Chicago and Omaha, the rate between these places on a certain line of staple manufacture being assumed to be 50 cents. Let us also suppose that on railroad A there is a local factory making this article as well as at Chicago. Under the old plan, if railroad B cut this rate one-half between the termini, railroad A would do the same, but leaving the local manufactory to pay 50 cents as before. While this continued the total revenues of railroad A would not be as much reduced as though the cut rate of 25 cents applied at once to the local station. Having assumed that the article was a staple, and one upon which the margin of profit was very close, the through rate of 25 cents from Chicago to Omaha would in a very short time make itself felt in the sales of the local factory still paying one-quarter of a cent per pound more than the Chicago competitor. The manufacturer would begin a series of appeals to the general freight agent of his road. He would justly argue that his factory was competing in Omaha with the Chicago factory just as certainly as though the two plants stood side by side. There was, he might continue, one great difference between them and that was that railroad A got the carriage of all his goods, supplies in and product out, while the shipments of the Chicago factory would be divided among the several roads. Hence, the best policy was to encourage and strengthen the local factory, of whose traffic the railroad was sure. These arguments could not but meet with the approval of the clear-headed railroad manager, and so in time the local rate would be reduced from 50 cents per hundred to the through cut rate of 25 cents. By the operation of the short-haul clause this reduction would be made at once, while under the old system the reduction would indeed come in time, but only under pres-

sure of argument and appeal. So we say that this short-haul prohibition is not in itself a cause of reduction in local revenue, but merely compels the prompt adjustment of rates which are competitive between factory and factory.

This adjustment of rates between one particular manufactory and another is one of the difficult problems of tariff making, but also one of the most important. It is complicated by competition between water and rail carriers, but, though subject to exceptions such as the need of earning fair returns, in the long run the one factory must be put upon even terms in the market as against the other if the carrier desires to see his traffic retained. The pinching of local industries in order to sustain a rate war on through traffic, aside from its injustice, is one of the most foolish practices from a business point of view in which a railroad can indulge. It is, in truth, killing the goose which lays the golden egg. As a matter of fact, these principles are recognized by leading men, who, nevertheless, inconsistently condemn the short-haul prohibition, though it puts their principles in concrete form. Subject to exceptions, as all broad theories of trade or political economy must be, the prohibition of high local as compared with low through rates is certainly correct.

Late Developments in Brazil.

Since our last editorial on Brazilian affairs in August everything has gone on smoothly. Dom Pedro II. continues in fair health in his retreat in the country at Petropolis. A good deal of his former visiting of public departments and of institutions is now discharged by his daughter, the ex-regent, Princess Isabel, and her husband. The Government and Ministry have pledged themselves to turning over a new leaf since the slavery question is out of the way. The reactionary policy of the last ten years is reversed, and the country inaugurates the new era with heavy expenditures on immigration and public works, which must be met by additions to the large foreign debt of the nation. Brazil is about to enter upon a period of expansion, dear to engineers and contractors, and usually very dear, indeed, to the nation that pays. The new policy has been greatly favored in its advocacy by the advance of exchange to 27½ pence per milreis (the first time since 1876)—that is, to about 1 per cent. above gold, par, the paper money thus achieving the rare result of being worth in the market more than the gold it pretends to promise to pay. There is even a prospect of a further appreciation of treasury bills, inasmuch as the incoming tide of British gold which has produced the phenomenon has not yet reached its maximum, and may continue to the close of the year. The passage of the new Banks of Issue bill is also of the greatest importance. Under its provisions the banks of issue are authorized to circulate their own bills upon a reserve of one-third gold, the remainder being guaranteed by deposits of 4½ per cent. national stock, to be created for the guarantee of the issues of the banks authorized by the measure. To a considerable extent the appreciation of paper money has, of course, also been brought about

by the restoration of confidence in the future of Brazil, since the decree of emancipation of May 13 has been followed by no disorder and by less disorganization of labor on the coffee estates than had been anticipated. The large crop of 8,000,000 bags of coffee has been secured, the freedmen working, it is true, a little sluggishly, and picking negligently, many of them, yet the work has been performed, and the coffee has been gradually advancing in value, so that to-day it brings 17 cents in New York, against the highest point reached in June, 1887, which was 22½ cents, the Brazil crop then being short. In other words, Brazil has this year been singularly fortunate in this item of coffee. Meanwhile sugar also brings nearly 1 cent more per pound in New York than it did last year, and, though late, the Brazilian crop is ample.

In spite of the willingness of the former slaves to perform plantation work in the provinces of São Paulo and Bahia, both these provinces have taken immediate steps through their respective Legislatures to procure immigrants from Europe by the hundreds of thousands, and since August last Italian laborers are pouring into Brazil. They get free passage for themselves and families per steamer direct; upon arrival agricultural implements are given them free and a week's provisions; besides in money \$12 to \$30 each single colonist, and families \$30 to \$60, of our money. These advances they have to refund gradually out of their earnings. Those who prefer to go into farming for their own account, may rent tracts of provincial land in lots of 15 or 30 hectares, the hectare equaling 2½ acres, or may buy such lands on easy terms. These inducements, in pamphlet shape, have been translated into Italian and other languages; emigrant agents are actively at work throughout Southern Europe, in Portugal, Spain, and especially in Italy, and the result is a swelling current of immigration into Brazil such as never has been seen. As the climate of São Paulo is healthy, and very nearly temperate, the great coffee region of that province attracts the new-comers particularly. The planters thus fully gain their point; whether the former slaves in the future work with a will or not, they will have no lack of white labor as good or even more reliable, and the high price of coffee enables them to pay liberal wages. Both São Paulo and Bahia have discarded the Chinese from the very commencement, thereby avoiding a serious mistake.

The credit of Brazil is now better established in Europe than ever. In April last the firm of Rothschild & Sons in London negotiated for the Government a loan of £6,000,000; subsequently the Government sold to a British syndicate the Leopoldine Railway for the sum of £7,000,000, and since then railway, provincial and municipal loans have been placed to a smaller amount or are still in course of negotiation.

On July 1 8573 km. of railway were in running order in Brazil, 1310 being built and 3597 authorized to be added, which will, when finished, constitute a total of 13,480 km. Of this total 4624 will be Government lines, 2797 with the interest guaranteed by the Government, 245 provincial, 2805 with interest guaranteed by provinces, 2917 private without interest guarantee and 92 tramways. Now great international schemes are being taken in

hand, in which to some extent American and Canadian capitalists will also be interested. One is the South American trans-continental scheme of extending the Bahia Central Railroad from Bahia to Arica on the Pacific, via San Francisco, in the province of Minas, Goyaz, Cuyaba and Oruro (Bolivia). The distance is calculated at 5700 km., and Bolivian trade is also to pass over it.

At the same time a syndicate of Canadian and American capitalists is reported to be undertaking a vast scheme for the development of the natural resources of the interior of Brazil. The syndicate includes Mayor Abbott of Montreal, who is a director of the Canadian Pacific, and Mr. Duncan McIntyre, an ex-director of the same company. No contracts for the carrying out of the scheme have been made, the Brazilian authorities agreeing to pay all preliminary expenses if the plans should prove unsatisfactory. Concessions to the syndicate will include mining rights for 99 years on the Rio Tocantins and tributaries and the privilege of purchasing all the land required at 1 cent per acre. The ball is thus fairly put in motion. All we can say is that with the growing well-to-do condition of Brazilian planters, in spite of the loss of their slaves, and the confidence which Brazil inspires on all hands, the great South American empire seems to be on the eve of a most promising future, which will be all the better for American trade.

Additions to Productive Capacity.

In many lines of manufacture the United States would appear to be overstocked. The capacity of existing establishments is far beyond the demand for the class of goods which they produce. The iron and steel trades abound in instances of this kind, which need not be particularized, as they are so familiar to all. In these branches prices are so low that proprietors of works have ceased to make calculations of possible profits, but are racking their brains to devise new methods of economizing so as to be able to reduce the cost of their goods to the selling level. Combinations, pools, agreements to restrict production and other artificial means of controlling the market and enhancing values have been tried, abandoned and tried again without success, until manufacturers are discouraged. Some of them are withdrawing permanently from the struggle, disgusted with the necessity which confronts them of paying for the privilege of manufacturing what the public requires. Yet there is not an established industry in this country in which additions to productive capacity are not being made at the present time, even including within the scope of this assertion the branches of trade which are obviously unremunerative.

This seems to be an inexorable law of the establishment of manufacturing industries. The United States now possesses ample capital seeking investment, experienced business men in almost every branch of manufacture thus far developed and a vast army of skilled workers to man any new venture or to meet the demand for an increased force in an enlarged factory. If a new section of the country is found to offer advantages for the seat of an industry the location is soon tested by some restless,

enterprising spirit with sufficient means to make the venture or with the requisite address to interest others possessing the means. The growth in population of sparsely settled districts making new trade centers, the discovery of natural resources previously unsuspected, the increase in transportation facilities and lowering of freight rates by the construction of new lines of railroad, all have their effect on the growth and dissemination of manufacturing industries, particularly when a country is peopled by a race eager to better its condition and ready at any time to change its location for a new one offering such an opportunity. To such a movement, involving a steady increase in productive capacity, even a financial panic is scarcely a check.

The greatest increase in manufacturing establishments naturally occurs when prices are high and profits large, either through an extraordinary demand or a scarcity in the supply brought about by combinations or other artificial influences. A strong argument against combinations is that they may in time intensify the evil of excessive competition and low prices, which they are created to alleviate, by inviting further investments of capital in the business as soon as it is made profitable. Yet, if this is the only argument to be advanced against combinations it lacks conclusiveness, because the unprofitableness of an industry by no means prevents others from engaging in the same line, firmly believing that they will be able to produce at less cost than the unfortunates already in the business or in some other way will secure an advantage over them. Outside influences are also having a decided effect on our present manufacturing development. There are speculative builders of manufacturing enterprises, who locate works at presumably good points, equip them with improved machinery, and launch them if possible when a wave of prosperity appears to be looming up in the distance. Land and town-lot speculations play their part also, quite a number of works recently put in operation or now in course of erection owing their origin to schemes of this character rather than to what might be termed legitimate trade influences.

Those who are waiting for a return of prosperity to come after our industries cease to grow, and who hope by keeping down prices to deter others from engaging in manufacturing enterprises or enlarging their works, apparently have a weary wait before them. They might as well stand on the banks of a river until the water runs by so that they can cross dry-shod. If they hope to continue in business themselves they must energetically determine to better their machinery, introduce more economical methods, remove nearer to sources of supplies of raw materials or nearer to their natural markets, or adapt their plant to the production of some specialty which is not overdone—if they can find it.

The *Rè Umberto*, recently launched for the Italian Government, is the largest war vessel in the world, her displacement being 13,298 tons. She is 400 feet long by 76 feet 9 inches broad, and draws 29 feet of water. The armor on her barbettes is 19 inches thick, and she is fitted with a 3 inch steel protective deck as well. Her main armament will be four 104-ton guns and twelve of 4½ tons, while her engines are expected to give a speed of 18 knots.

Convict Labor in Texas.—II.

BY JOHN BIRKINBINE, PHILADELPHIA.

Having described existing conditions, the queries suggested may be taken up.

1. Is the employment of convict labor prejudicial to free labor?

All men in the Texas penitentiaries, before their incarceration, belong to one or the other of two classes: they were either workers or loafers. If they were workmen they competed with other workmen; if they were loafers they lived off of others who worked. If the State forces the convicts to work it does not add to the actual number of workers, except in so far as it makes use of one who did nothing for himself or was of no use, but, rather, a detriment to others. Is not free labor rather benefited than otherwise by having a less proportion of taxes required for prison expenses, and by having ex-convicts returned to the community educated to do something helpful?

2. Does not the State become a damaging competitor with private enterprise?

There seems little reason to expect such a result if the present policy—that of making the penitentiaries self-supporting—is followed; if the State is willing to lose money on its manufacture, then the use of convict labor may be an injury to private enterprise. Reports show that the cost of feeding, clothing, guarding and caring for the State convicts, not including any interest on money invested in buildings or lands, is about 50 cents per capita per day, but there are a large number who are not actual producers; the office, the hospital, the kitchen, the laundry, the repairs of shoes and clothing, the cleaning of cells, buildings, &c., all take from the number actually engaged in productive labor, bringing the cost per capita to probably 60 cents per day. But, as this compensation is based on 365 days per annum, and as the men work but six days per week, the actual cost of convict labor per working day does not fall much below 70 cents per day per man. The fact of the blast-furnace working continuously does not seriously influence this, as the number of men employed on Sunday is small, and each man receives 60 cents for his extra time. Other conditions also add to the actual cost of convict labor. In case of inclement weather no outside work, such as mining ore, chopping wood or farmwork, is permitted, a light rain throughout which free labor would work being considered as sufficient cause for bringing the convicts under shelter. As a rule, the convicts work because the State demands it, or because it is a relief to the monotony of prison life, the incentive which a free laborer has to earn a living for himself and loved ones is missing, and, although there are many instances where convicts put enthusiasm into their work, it cannot be expected to be the rule. Again, the management must be careful to avoid overtaxing convicts, for the public sentiment, which was offended by the now extinct contract system, would champion, without investigation, the cause of any convicts whose friends should find them to be as they supposed, overworked. But the policy pursued by the Penitentiary Board has been to favor the establishment of industries in Texas, and not to sell its products below the market. In fact, one strong argument favoring the location of the penitentiary at Rusk was to develop the State resources and to encourage industries. That this result will follow is evident, for private enterprise is now erecting a blast furnace within 3 miles of the Rusk Penitentiary, and about this other industries are expected to center. If the State was a damaging competitor, capital would hardly come right beside the State fur-

nace, but seek a location elsewhere. The establishment of the iron industry at the penitentiary has been the instigating cause for the selection of New Birmingham as a site for industries, and the penitentiary officials have given every assistance possible to the enterprise. The contract for the State capitol castings was awarded to the penitentiary as much from State pride as on account of the price paid, for its bid closely approached the proposals of outside parties.

The appropriations made at the last Legislature were for improvements, and not for prison sustenance. The total amount appropriated was about \$10 per convict per annum, so that even had it been used for maintenance it shows that the burden is lifted from the taxpayers by the convicts. But the Texas penitentiaries are practically self-sustaining, and if the management is continued so as to secure this there appears to be no reason why the State should be a damaging competitor with any industry properly established and managed.

3. Is the system of punishment reformatory and sufficiently severe to encourage the reduction of the number, or, rather, the proportion, of criminals?

Immediately upon entering the penitentiary a convict, after bathing, assumes the distinct clothing furnished by the State, and realizes that he is no more a free man. His time belongs to the State; he is constantly under surveillance; he has no choice as to the disposition of his time, but must rigidly adhere to the rules established for prison discipline, and he must recognize that there is no relief except such as he earns by meritorious conduct. He must rise at the time assigned, arrange his cell, march in line to breakfast, eat the plain but substantial fare provided, march out under guard to his work, receiving his mid-day meal either at work or in the dining hall; then resume work and march to supper, after which he is searched and locked in his cell. Then, unless deprived of the privilege by reason of insubordination or misbehavior, he may read books obtained from the prison library or write until the time for bed, but what he reads or what he writes is subject to inspection by the officials. In fact, whatever he does impresses him with the knowledge that he has forfeited his right to freedom.

He might possibly receive more severe mental punishment by solitary confinement, but this would only last as long as the mind was active, and he might devote his time to taming mice or other harmless diversions. He would receive greater physical punishment by the stocks or thumb-screws, but would either the mental blank or the physical torture reform him? Is not his punishment just as severe as far as it affects him by depriving him of any choice as to what he shall do, wear or eat, except within narrow limits, and compelling him to exert himself, so that he will not be a burden to the community whose peace he has offended? Is not active work better discipline and more christianlike than a brief daily aimless walk for the exercise necessary to keep a man from dry rot? Is not the attention which he must bestow on his work better use for his brain and for the community than the useless mental wanderings of solitary confinement? The discipline is rigid, and infractions of the rules are promptly punished—first by depriving the convict of privileges, next by confinement, except during working hours, to darkened cells; finally, the whip is used, but only on written orders from the superintendent. On the other hand, good behavior earns the privilege of extra cell furniture, the use of the library and other privileges which may seem of small importance to outsiders, but are of great moment to the convicts. The only question which is suggested is whether the

freedom of association, which outside work permits, is demoralizing; but the disposition of the force of convicts and the constant surveillance to which they are subject reduce this risk, and a man may run just as much chance of profiting by the good influences which he receives from one brother convict as in the bad which he may absorb from another. The confidence reposed in "trusties" would seem to indicate that the discipline is sufficiently severe for punishment, and yet humanitarian enough, to aid in reformation. The proportion of criminals to the population must be determined by statistics which are not at hand. In a State where the population grows as rapidly as that of Texas, and which draws into it so much of the element which confounds license with liberty, it is probable that the number of convicts is on the increase, and there are undoubtedly those who, after being released, return to the penitentiary. But, without claiming expert knowledge upon prison reform, the conclusions arrived at commend the system employed at the Rusk Penitentiary, which appears to be for the good of the State and the convict.

It is, however, difficult to become accustomed to the presence of armed guards and to the knowledge that the lash is among the possible punishments. Of punishments the prison rules provide that "the severer modes of punishment, and especially whipping, shall only be resorted to after milder means have failed to bring the offender to terms. A sergeant desiring an order to whip a convict must make an application in writing to the inspector stating fully the offense, and that other means had been tried and failed to produce the desired effect.

"In whipping, a leather strap, about 2½ inches wide and 2 feet long, fastened in a wooden handle, shall be used, and care must be taken not to break the skin. Every officer inflicting this or any other punishment will be held to a strict account that it is not abused.

"A guard inflicting punishment, even by order of the sergeant, shall be promptly discharged.

"No convict shall be made in any manner to punish another convict."

Whether the system employed in treating convicts in the State penitentiaries in Texas is the best must be left to the decision of others who have made prison reform a study. But the condition, appearance, health and general bearing of the convicts in the Rusk Penitentiary give evidence of fair treatment, good food and rigid discipline, and is in marked contrast with the condition of affairs in New York State prisons as set forth in the *Tribune* of December 5, from which the following extract is made:

ALBANY, December 4.—The State prisons are in a wretched condition. There are 1000 idle convicts in Sing Sing, 600 at Dannemora and 1000 at Auburn, making a total of 2600 convicts who are daily locked up in their cells in the State prisons because there is no work for them to do. This misfortune to the State is caused by the law passed in July by the Legislature forbidding the sale of any goods made by the convicts, and restricting the profitable labor of the convicts to the manufacture of articles needed by the prisons or by charitable institutions. Experience has shown that the charitable institutions already manufacture for themselves with their own inmates, 17,608 in number, 60 per cent. of the clothing and other articles they need. Experience has also shown that 150 convicts out of the total of 3008 can manufacture all the goods that are yearly needed by the prisons and charitable institutions. All the wardens reported that the convicts were suffering in health owing to their enforced idleness, and expressed fears that before spring there would be much sickness in the prisons. The prisons were also, they reported, running behind badly in a financial way. In another year, if the present miserable system is continued, the taxpayers of the State will be compelled to make good a deficiency of \$400,000. That will be the cost to the State of supporting the convicts in idleness.

Analysis of Chrome Steel.

Two graduates of the Stevens Institute of Hoboken, N. J., B. Franklin Hart, Jr., and Julius Calisch, prepared a thesis on chrome steel, its manufacture and uses. They review the literature of the subject, allude to the manufacture of chrome steel at Brooklyn, recall the tests of the alloy in connection with its use on the St. Louis bridge and go into details of the methods of analyses employed by them. It is in the direction of analyses that original work appears to have been done. We quote below the results of their determinations, with all the decimals which are dear to the young chemist:

	"No. 1" steel. Per cent.	"No. 1" steel. Per cent.	"No. 3" steel. Per cent.	"No. 3" steel. Per cent.
Carbon.....	1.1071	1.1453	0.7283	0.7417
Phosphorus.....	0.0354	0.0410	0.0186	0.0158
Chromium.....	0.7563	0.6827	0.5127	0.5368
Silicon.....	0.1292	0.1339	0.1754	0.1614
Sulphur.....	0.0065	0.0058	0.0063	0.0088
Manganese.....	0.0219	0.0231	0.0163	0.0108

	No. 1 "magnet" steel. Per cent.	No. 2 "magnet" steel. Per cent.	No. 1 "rock drill" steel. Per cent.	No. 3 "rock drill" steel. Per cent.
Carbon.....	0.9371	0.9653	0.8508	0.8480
Phosphorus.....	0.0522	0.0439	0.0218	0.0190
Chromium.....	0.4940	0.5974	0.5455	0.4083
Tungsten.....	0.6186	0.7614	.....	.....
Silicon.....	0.0550	0.0613	0.1246	0.1359
Sulphur.....	0.0043	0.0050	0.0057	0.0060
Manganese.....	0.0167	0.0167	0.0112	0.0094

All the samples analyzed were the product of the Chrome Steel Works, at Brooklyn, No. 1 steel being used for turning, planing and other tools used for purposes requiring a steady cut. No. 3 steel is made for all kinds of fine edge tools, chipping chisels and machine-shop tools of every description. Magnet steel, as the name indicates, is used for permanent magnets, and rock drill steel for mining, quarry and stone-cutters' use.

Board of Railway Control.—Substantial progress has been made during the last week in the formidable task of bringing all the leading trunk-line railway corporations into harmonious action with reference to freight and passenger traffic. As if supplementary to recent action which promises well for the establishment of permanent and equitable rates on merchandise bound East or West, the officials of Western roads now announce that an agreement affecting their properties has been reached, after protracted conferences. Western and Southwestern rates, it is promised, will be restored after January 1. Conferences of the Western Freight Association were followed by meetings of railway managers in this city, at which the subject was fully considered, with the result of giving sanction to the agreement entered into by nearly all the roads west of Chicago, each of the presidents pledging himself personally to see that equitable rates are made and enforced. Several large banking houses representing foreign holders of railroad securities were parties to the proceedings, all alike seeming desirous of reconciling their interests and conforming in the most liberal sense to the requirements of the Interstate law. The practical result is the formation of a Board of Control, with all concerned mutually pledged to maintain rates on a sound business basis. At any meeting of stockholders it will be possible to oust from his position any reckless official, for the protection of investors.

The Indiana Natural Gas District.

II.

ANDERSON.

Some very important manufacturing establishments have already been located at this point and others are expected soon to follow. They comprise a bolt works, straw-board works, edge-tool works, glass works, butter-tub factory, foundry and machine works and a number of wood-working concerns which are now in operation, and a wire-nail factory in course of erection.

The Anderson Bolt Works were the first comers, removing to this point from Fowlerville, N. Y., near Buffalo, and were put in operation last spring. Their main building is 250 feet by 50 feet, the engine and boiler house is 30 feet by 24 feet, and the iron stock house is 60 by 20 feet. They are built of wood, with an iron roof. The Walworth fire sprinkler has been applied throughout the works for protection against fire, with discharge vents 10 feet apart. The plant is well arranged for the receipt and shipment of material and finished product. A narrow-gauge railroad runs from the shipping and receiving room the entire length of the works, this room opening on a railroad siding. The equipment of the plant consists of a large number of machines for the manufacture of carriage and machine bolts, bridge and roof bolts, wood or log screws, skein screws, bolt ends, square nuts, hexagon nuts and washers. The capacity daily is about 75,000 bolts of all kinds. The arrangement of the works received the careful attention of the manager, L. S. Taylor, formerly connected with the Unionville works of the Upson Nut Company, and who afterward built the Aetna Nut Company's Works, at Southington, Conn. The iron manipulated at these works is purchased from the rolling mills and comes principally from Youngstown, Ohio. The entire establishment is run with natural gas for steam raising, heating iron, light, &c., less than 1 pound pressure furnishing an adequate supply. The engine and boiler were built at Buffalo by G. W. Tift & Son. The engine is of 80 horse-power. The engineer in this establishment is a skilled machinist, and to employ his many leisure moments he has a lathe in the engine-room on which he makes all the dies used in the works. A novel arrangement has been introduced for the purpose of preventing the unnecessary waste of oil at the nut and bolt machines. Two barrels are sunk under the level of the floor at one end of the factory, one containing the oil and other ingredients of the lubricant, and the other intended as a receiving and settling tub, having an overflow into the first barrel. A pump forces the oil up into overhead pipes running to the machines, and pipes under the machines catch the waste oil and return it to the settling tub.

Manning & Farmer have just put in operation the Anderson Knife and Bar Works. This is a wholly new enterprise, established for the purpose of manufacturing knives for woodworking machines, book binders, paper trimming, leather splitting, fodder knives, shear blades, paper-makers' fly bars, &c. The factory consists of a frame building 208 x 35 feet, two stories high in the center and one story high at each end, with an engine room in a one-story annex on the side. The ground floor is divided into a forge-room, machine shop, grinding-room and office. The forge-room contains a small direct-acting steam hammer, a train of rolls, two heating furnaces and a smith's fire. One of the heating furnaces is intended to serve the rolls and hammer and the other is used for tempering. Steel bars are bought from steel manufacturers and are rolled into the special shapes and

thicknesses desired. The train of rolls is two-high, the upper roll being adjusted by independent screws in the housings, so that one side can be elevated slightly higher than the other when rolling bevels, guides in front of the rolls keeping the steel in proper position when being rolled. Plain rolls are used on some work and rolls with beveled grooves on special patterns. The hammer is used for forging odd shapes. The engine running the rolls and hammer is not connected with any other machinery. The machine shop is equipped with drills, planers and lathes. The grinding-room is unusually roomy, and well lighted. It contains five large stones and one small stone, each connected by a belt with a main shaft, fitted with the Cuyahoga Pulley and Shafting Company's friction clutches, by which each stone can be started and stopped independently of the others, yet avoiding the use of loose pulleys and the excessive wear of the belting. The second story, over the machine shop, is devoted to patterns. The proprietors of these works were formerly residents of Dayton, Ohio. S. E. Farmer was for many years the practical man and superintendent of A. A. Simonds' works, at Dayton, and has had a wide experience in the manufacture of the special products which the new works will make.

The buildings of the American Wire Nail Company, of Covington, Ky., are in course of erection, a large part of the framework being in place, and the foundation piers for the remainder stretching over a vast expanse, indicating the immense proportions of this plant. It will comprise a rod mill, wire-drawing works and wire-nail factory. The site chosen for the works appears to have been selected with admirable judgment, both for proper elevation and for railroad facilities.

Four railroads connect Anderson with the outside world—namely, the Chicago, St. Louis and Pittsburgh, the Cincinnati, Wabash and Michigan, the Midland (a new line running to Terre Haute), and the Cleveland, Columbus, Cincinnati and Indianapolis.

MUNCIE.

This is also becoming a manufacturing center of some importance. It contains an iron-bridge works, a wood-bending works and four glass factories; nail works and a glass works are in course of erection, and negotiations are progressing for other enterprises. Of the glass factories in operation two make window glass, one makes bottles and one fruit jars, the window-glass works being of large capacity.

The Indiana Bridge Company removed to Muncie from Indianapolis a short time previous to the development of the natural gas field, having been influenced in their choice of locality by other considerations. They have used natural gas throughout their works, however, from the time they were completed. They own 4 acres, affording them ample room for extending their operations. Their main building is 200 x 45 feet, and the smith-shop is 100 x 40 feet. Their yard, used for erecting purposes, is 250 x 125 feet. The main building has a traveling crane running its entire length, and covering every part of the shop, for the transfer of heavy material. In addition a narrow-gauge railroad track extends through the center of the building, across the erecting yard and through the smith shop, having turn-tables at suitable points. The company have a steam riveter, make their own rivets, and have a full equipment of other machinery suitable to the manufacture of iron bridges. They forge their own eye-bars, except when other makes are specified. A large gas-heating furnace will shortly be erected for heavy work. The company make a specialty of patent leg bridges,

and also control a patent method used in long span bridges, by which one post is used where other companies generally find it necessary to use two. The patent leg bridge is suitable for spans up to 70 feet, and is intended principally for highways and for other purposes calling for a cheap, yet durable, bridge. They avoid the use of stone abutments, being supported on posts at both ends, which are thoroughly braced and backed with heavy lumber for earth filling. This is quite a feature in many localities in the West which are without suitable stone. The company purchase their bridge material at Pittsburgh and points further East, as it is found most convenient. They are well supplied with winter work, having sixteen bridges to construct. C. M. Kimbrough is president and general manager; John R. Marsh is secretary and treasurer. In addition to these gentlemen the board of directors consists of George T. McCulloch, T. F. Rose and A. L. Johnson.

J. H. Smith & Co. operate a wood-bending works, which has been established at Muncie for three years. They manufacture shafts, poles, rims, singletrees, &c., but do not make hubs and spokes. They have just completed an extension to their factory 70 x 43 feet. The entire building is now 220 feet long, the old portion being 60 feet wide. It is two stories high, and is built of brick. Lumber is taken in the rough and sawed to size, then finished to the desired shape or pattern. The Almy end pressure is used in bending rims, and Smith's improved shaft and pole bending machinery is used for shaping shafts and poles, the wood being thoroughly steamed before bending. The works employ about 125 hands and turn out a large product, which will be increased as soon as the addition to the works is fitted with machinery. The method pursued here in drying lumber is somewhat novel. A rough house was built of rejected pieces, piled up after the fashion of a log house, and having ample ventilation through interstices and openings purposely made. A few natural gas burners beneath the piled lumber inside furnish the heat. The temperature is not allowed to rise above 80°, the supply of gas being temporarily cut off when a higher heat is reached. The peculiar action of the gas is such that in six days the lumber in the kiln is ready to be used for any purpose, or can be exposed to the weather without damage; is not brash and does not "check" or split open, as does lumber dried with steam or hot air. Natural gas is used for raising steam, it having been found cheaper and more desirable to burn the offal of the wood working machines in special furnaces to get rid of it than to use it for fuel. The firm issue a catalogue of 16 pages, giving illustrations of their goods and a complete price list.

The Muncie Nail Company have their works nearly completed, and expect to put them in operation early in the coming year. The company formerly operated works at Greencastle, Ind., under the name of Greencastle Iron and Nail Company, and have removed to Muncie to secure the advantage of free natural gas. Efforts were made to find natural gas at Greencastle, but they terminated in complete disappointment, although wells were sunk to a depth of 2000 feet. The works at Muncie are constructed partly of the material of the Greencastle works, but the machinery is practically new and of the best construction. They have 16 puddling furnaces, a muck train, a plate train and 50 nail machines for making cut nails. Room has been provided in the factory for 25 additional machines, so that the company can increase their cut-nail plant or put in wire-nail machines, if it may prove desirable in time to do either. Both iron and steel nails will be made, the company having a trade in both. They will purchase

steel slabs for the present, being disinclined to erect a steel plant at this time. The works include a foundry for the manufacture of iron and brass castings, both for their own use and for outside parties. There is also a machine shop for roll turning and repairs. The company have their own keg factory. The buildings are frame, covered with steel sheets. J. F. Darnall is president of the company and G. H. Brown is secretary and treasurer.

The railroad connections of Muncie comprise the Cleveland, Columbus, Cincinnati and Indianapolis, the Lake Erie and Western and the Fort Wayne, Cincinnati and Louisville lines.

MISCELLANEOUS NOTES.

In addition to the four principal points above considered, some of the smaller towns in the district enjoy a bright prospect of industrial growth. They have the same opportunity to obtain natural gas by merely sinking wells, and while they are availing themselves of the supply of cheap fuel for domestic purposes, they do not lose sight of greater benefits. Hartford City is one of them, and there are perhaps others with equally good prospects of shortly becoming the seat of a fair degree of industrial enterprise.

A number of cities and towns on the border of the gas district, up to 25 miles distant, have been connected with the gas wells by pipe lines, or are making such connections as rapidly as possible. Indianapolis, Richmond, Frankfort, Lafayette, Peru, Logansport and others will thus be able to realize some of the advantages of gaseous fuel, although it will necessarily cost them more than if they were located in the immediate vicinity of the wells.

In conclusion, an important point in connection with the Indiana natural gas district cannot be overlooked. Its geographical position is highly advantageous. It is located almost in the center of a circle having in its periphery such important cities and distributing points as Chicago, St. Louis, Louisville, Cincinnati, Cleveland and Detroit, with the great iron and steel producing districts of Ohio and Western Pennsylvania within quite easy reach. It is traversed by the great highways of commerce between these cities, and not by mere branches or feeders.

Wear and Stretch of Cables.

Mr. G. Leverich, in his paper on the Brooklyn Bridge cable railway, presented a short time ago to the American Society of Civil Engineers, presents some interesting facts on cable wear and stretching. He points out, among other things, that by the constant bending of the cable around the sheaves and drums, where there must be a slight movement of the strands and wires over each other, and particularly at the splices where the ends of the strands lap; the inner projecting surfaces in contact are abraded and wires from time to time broken. The outer surfaces of the exterior wires are also worn away, somewhat by the action of the grip sheaves, but more by contact with the grooves in the sheaves and by the slip in the grooves of the drums. An experimental grip with revolving solid metal jaws was tried on one car on the bridge for a few trips early in 1884. Shortly afterward wires were found nearly or quite pinched off, being imbedded, where they crossed, as if sunken under a heavy hammer, and in one instance 200 broken wires in 100 feet of cable length were reported. In a hauling cable, however, the wires are constantly breaking; so long as the ends do not project and strip, the only injury which results is the decrease in cable strength, and this is slight if the breakages are evenly distributed and not

close together. As may be expected, the wear requiring attention and repair is confined to the splice and its immediate vicinity. This repair is usually accomplished by inserting a new piece of cable. Sometimes, however, a short piece of badly worn strand has been replaced by a new one. No cable has been broken on the bridge and only once has a strand hauled loose and unwound.

During the period a hauling cable is used it permanently stretches, at first rapidly and afterward at a lesser rate and quite uniformly. Since March, 1883, a daily record has been kept of the position of the Brooklyn tension car. From this and earlier data, the stretch of these cables is readily deduced, and is here given.

Stretch of Cables.

Cable.	Length of Cable Hauled.	STRETCH.			
		For Total Length Hauled.	For Last 25,000 Miles Hauled.	Per Mile Of Total Length Hauled.	Of Last 25,000 Miles Hauled.
	miles.	ft.	ft.	in.	in.
First.....	25,000	67.	67.	0.032	0.032
"	50,000	109.	42.	0.028	0.02
"	75,000	127.3	18.3	0.02	0.009
"	100,000	150.6	23.3	0.018	0.011
"	125,000	176.5	25.9	0.017	0.013
"	150,000	192.5	16.	0.015	0.007
"	175,000	216.7	24.2	0.015	0.012
"	200,000	240.2	23.5	0.014	0.011
"	225,000	263.5	23.3	0.014	0.011
"	250,000	287.8	.....	0.014	.....
Second.....	25,000	136.	136.	0.065	0.065
"	50,000	172.	36.	0.041	0.018
"	75,000	210.7	38.7	0.034	0.018
"	100,000	250.7	40.	0.03	0.019
"	107,274	287.	.....	0.032	.....

When taut, and the tension car is at its highest position, the cable is about 11,400 feet long; whence the first cable during its entire use stretched 2.35 per cent., and the second cable, up to May, 1888, stretched 2.52 per cent. During each 8 hours of the first 40, after the second cable was put in, it stretched 16½ feet, 3½ feet, 6½ feet, 2½ feet, and 1½ feet, respectively, or altogether 30½ feet; some of this doubtless was slack, not all taken out when the splicing was done. The stretch of a cable is due partly to the tension to which it is subjected, but doubtless much more to the action of the grips. The latter were applied 1074 times for the 329 trains run April 29, 1884; 2150 times for the 515 trains run April 27, 1886, and 2688 times for the 487 trains run May 1, 1888. Taking 106 feet as the mean length of cable which passes between the grip sheaves, from the time the grip is closed until the train moves at full speed, on the days mentioned, the total length of cable thus subjected to pressure was 114,918 feet, 230,050 feet, and 287,616 feet; and if the compressed spaces were uniformly distributed, the whole cable passed between the grip sheaves, 10, 20, and 25 times, respectively. As the cable stretches, the hempen core becomes harder, more compact, and, of course, smaller; from this as well as wear, the cable also is reduced in size; the first, when taken out, being but 1½ inches, and the one in use now is about 1⅞ inches in diameter. Besides stretching permanently, the cable under changes of load and variations in temperature, extends or contracts within elastic limits, sometimes to a noticeable extent; data, however, are lacking to determine with precision how much is this movement separate from the other.

An officer of the Philadelphia Natural Gas Company, at Pittsburgh, is credited with the following statement: "Experiments prove that with the present method of boiler heating it requires 2½ cubic feet of gas to evaporate 1 pound of water. The use of a proper burner will enable 1 pound of water to be evaporated by 1.38 cubic feet of gas. When we consider

all the boilers in the two cities that daily evaporate hundreds of gallons of water we can see that the excess of gas used amounts to millions and millions of feet weekly. The same principle applies to the making of salt and the puddling of iron. To puddle a ton of the latter the mills now use 28,000 cubic feet of natural gas. The same work may be done with 14,000 feet. Of course the mill owners make no effort to save, as they get the gas by contract, but when the meters are ordered to be placed in every establishment everybody will see the necessity of adopting economizing methods."

Logansport and Peru (Ind.) Industries.

The Logansport Mfg. Company, of Logansport, Ind., are manufacturers of hubs, spokes, rims, shafts, wagon-poles and other wagon woodwork. Their works are located in the heart of the Indiana hardwood district, which has a reputation for its timber among the wagon and carriage manufacturers of a large part of the country, but more especially in the West. The company have their own sawmill, and thus possess an advantage over many similar establishments in controlling the stock for their factory.

They employ about 85 hands, in addition to the force engaged in the woods. The factory contains machines for bending shafts and poles, bending rims for wheels, turning spokes, turning and mortising hubs, &c. The stock for the bending machines is steamed, then placed in the machines, bent in the desired shape, clamped so that it cannot straighten, and put aside with the clamps on until it dries. The spoke-turning machines have a traveling bit, which moves along horizontally and turns the spoke into the shape of a steel pattern placed above, which governs the motions of the bit most accurately and ingeniously, even finishing the hub-end of the spoke square. The hubs pass through three machines. The first bores the axle-hole, the second turns the hub in its proper shape, with great rapidity, and the third mortises the holes for the spokes. This mortising machine is partly automatic in its operations. The workman first guides its motions in boring holes in the proper place for each mortise; then sets the chisel machinery in operation, and the machinery finishes one hole after another without further attention until the last hole is completed, feeding the hub accurately and very rapidly for the operation of the chisels. The chisels are two in number, and they first descend close together into the hole previously bored in the hub. They are gradually spread, by a cam motion, to the full width of the mortise. The company publish a catalogue of 44 pages illustrating the various kinds of goods which they manufacture and giving complete price lists. A. J. Robinson is president and John E. Redmond is secretary.

S. E. Howe, of Logansport, Ind., manufactures plow-handles, plow-beams and rounds, cultivator handles and wagon woodwork, in connection with his hardwood lumber business. His factory is a commodious and substantial brick building, and he employs 50 hands.

The King Drill Company, of Logansport, Ind., have recently engaged in the manufacture of windmills. They turned out 100 in the last season, and expect to do a much larger business in the future. While their trade has been mainly local, they have sold some mills as far West as Iowa. The mill they manufacture is known as the Improved Aldrich. The patentee, W. H. Aldrich, who superintends its construction, has had 20 years experience in building and erecting mills. The Aldrich pump is a double-acting anti-freezing force pump, with a three-way cock, to be used with a windmill or to be oper-

ated as a hand force pump, which is also manufactured by the company. Their principal business has hitherto been the manufacture of grain drills, but this branch of trade is now unremunerative on account of excessive competition among the numerous manufacturers. They have a machine shop and foundry, and do general repair work in addition to the manufacture of specialties mentioned.

The Indiana Mfg. Company, of Peru, Ind., will put a new refrigerator on the market this season under the name of North Star. It will be constructed on a different principle from other refrigerators, and will be intended strictly for domestic use, and not for creameries or other establishments requiring very large refrigerators. The works of this company are very extensive, are located in a good hardwood lumber section of Indiana, and are operated largely on sewing-machine frames for manufacturers of sewing machines in various parts of the country. Natural gas has been piped into Peru from the Xenia gas wells, 16 miles distant, and is now being used largely for domestic and manufacturing purposes. The Indiana Mfg. Company, however, use the offal from their wood-working machines for raising steam. In their refrigerator department they manufacture about 1000 per month during the season. They will be sold exclusively through Bennett & Shirk, 112 and 114 Lake street, Chicago.

Tariff Revision in Sweden.

The Scandinavian peninsula has just concluded a season of tariff agitation. The protective party having come into power in the Swedish Diet, a number of important changes have been made in the customs schedules. In most instances the revision has amounted to a large increase of previously existing rates. The revised list is characterized as the "new system." The changed policy of the kingdom began by the imposition of an almost prohibitory duty on breadstuffs at the beginning of the year, followed by an entire tariff revision, which went into operation on July 1, 1888. The following list will show the old and new rates on the products of metallurgical industries. The rates are in kroners, 1 kroner equals \$0.268, and öre, 100 öre equal 1 crown.

Iron and Metals.

Pig iron and scrap iron and steel, 80 öre per 100 kg. (before free).
Blooms of iron and steel, 2 crowns per 100 kg (before free).
Beams and other forms of iron of lower weight per m. than 20 kg., 2.50 crowns per 100 kg. (before free).
Bar iron, 2.50 crowns per 100 kg. (before free).
Sheet iron, not polished, 3 mm. thick and more, 3 crowns; less thickness, 4 crowns; polished, varnished and nicked, 6 crowns (before free).
Anchors, drags, &c., 4 crowns per 100 kg. (before free).
Chains with 6.25 mm. diameter of the links, 7 crowns per 100 kg.; 25 mm. or more, 8.50 crowns per kg. (before free).
Nails, large, 4 öre per kg. (before 3 öre).
Screws, for wood, 75 mm. long and more, 20 öre; less than 75 mm. 30 öre (before 15 öre).
Castings: Beams, columns, fences, &c., 2 öre per kg. (before 1 öre); stoves, cooking vessels, 4 öre per kg. (before 2 öre); tables, chairs, smoothing-irons, &c., 10 öre per kg. (before 8 öre); copying presses, mincing machines, &c., 20 öre per kg. (before 15 öre); finer castings, 40 öre per kg. (before 25 öre).
Iron and steel wires, thick, 4 öre; fine 8 öre per kg. (before free).

Railway material: Axles, springs, wheels, wheel bands, 5 öre per kg.; not specified, 10 per cent. of the value.
Copper and other wire, 10 öre per kg. (before free).
Metal wire (before free), duty as on other wire.
Printing types, letter stamps, 25 öre per kg. (before free).
Guns and rifles, 1 crown 50 öre per kg. (before 50 öre).
Fire engines, syringes, 10 per cent. ad valorem (before 5 per cent.).

Natural Gas for Louisville.

Louisville is now assured of a supply of natural gas for heating purposes, which is to be piped from Meade County, a distance of 30 miles. The contract for 8-inch pipe has been let to Morris, Tasker & Co., who are to begin delivery next week. Ackerly, Sammel & Perrin, contractors for laying the line, are now at work clearing away timber, making excavations and telephone connections, &c. They promise to have the line complete inside of 90 days, probably in 50 days.

The Kentucky Rock Gas Company are the promoters of this enterprise, and have borne all the expense, without outside capital, this being essentially a home undertaking. The following well-known business men are directors and incorporators: J. H. Lindenberger, John B. Castleman, Wm. J. Davis, R. T. Durret, John H. Ward, W. J. McConathy, M. S. Barker, N. Fenzer, James Carter, the first three being president, vice-president and manager respectively. Major Davis has worked hard for the success of this enterprise, and to his energy belongs its success. This company proper own about 15 wells, with a daily flow of 11,000,000 cubic feet, but some of these are small producers. They control 13 other wells giving 7,000,000 cubic feet more, in all about 18,000,000 feet per day. Some of these wells give dry, pure gas, while others throw out large quantities of salt water, but the gas can easily be separated, as is done in some Pennsylvania districts, and if the natural pressure, which is about 120 pounds to the square inch, should not be sufficient, force pumps will be used.

The quality of the Meade County gas is said to be purer, and can be used with little or no purifying for illuminating purposes. One point of interest to the future consumers is the probable cost to them. The company propose in no case to charge more than 20 cents per 1000 feet, that being their maximum, but to range from that down to 10 cents if necessary. This will insure the gas being used generally for fuel, doing away with the clouds of smoke that continually hang over the city; a nuisance that has been yearly increasing in proportion to the growth of manufacturing.

Prof. Richard Proctor, State Geologist, who has done a great deal in opening new fields of enterprise in the State, has been studying the Meade County gas fields, and recently had associated with him Professor Orton, State Geologist of Ohio, a high authority on matters of gas and oil. Professor Orton's report, just published, proves conclusively that the supply in this region is likely to be as lasting as in any other part of the country, his theory being that all natural gas is stored in certain localities in reservoirs of various capacities, and not produced by any course of nature now in force.

These 28 wells are scattered over a territory of many miles in extent, showing that the field is large, and many of the largest pouring out over 1,000,000 cubic feet per day each, and have been running without diminution for nearly a year; and one, the Moreman well, bored 26 years ago, in the search for oil, has been flowing un-

ceasingly since that time, and for the last 18 years has been used in the manufacture of salt from the brine running from the same well. The salt water issuing from some of these wells will undoubtedly be utilized at no distant day, as it is strong and pure, and in quantity.

Treasury Decisions.

DUTY ON WALL-PAPER ROLLERS.

The appellants claiming 35 per cent. instead of 45 per cent. ad valorem, the Treasury Department has decided in favor of 45 per cent. on the ground that the articles consist of wood rollers, on the surface of which is wrought in brass a design or pattern, and being manufactured in part of metal they were returned for duty at the rate assessed under the provisions of schedule C (T. I., 216), for "manufactures, articles or wares not specially enumerated or provided for * * * composed wholly or in part of * * * metal."

DRAWBACK ON WOVEN-WIRE MATTRESS-FABRIC.

The Secretary in a letter to the Collector of Customs says: "On the exportation of so-called mattress-fabric, manufactured by the Hartford Woven-Wire Mattress Company wholly from wire made of imported steel rods, a drawback will be allowed equal in amount to the drawback payable under the existing regulations on the quantity of such wire contained in the exported fabric," and gives directions as follows: "The exporter will be required to supplement each entry with a certificate, under oath or affirmation of the proprietor or superintendent and foreman of the factory where the wire was drawn, stating the particulars of the importation, with the invoice mark, and weight of the imported rods used, the weight of the wire produced therefrom, and its size by the wire-gauge. Each entry must also be supplemented with a separate statement of the weight of the exported fabric, verified by the oath or affirmation of the person by whom it was weighed. The usual oath of the proprietor and foreman on the entry will be so modified as to include a statement showing that the fabric specified in the entry was made wholly from the wire described in the certificate of the proprietor or superintendent and foreman of the wire factory. The Department concurs with you in the opinion that no drawback can be allowed on the completed wire mattresses manufactured by said firm in part from domestic wood, and their application for the establishment of a rate of drawback on the wire-fabric entering into such mattresses is, therefore, hereby denied."

DRAWBACK ON HUNGARIAN STEEL NAILS.

The Secretary of the Treasury writes to the collector at Boston. "On the exportation of the Hungarian nails manufactured by E. Phillips & Sons, of South Hanover, Mass., wholly from imported boiler-steel shearings or steel-plate scraps, a drawback will be allowed at the same rate as that prescribed by the Department's instructions of September 8, 1887 (Synopsis 8424), for steel nails manufactured from imported steel slabs by the Fall River Iron Works Company, of Fall River, Mass.—viz., equal in amount to the duty paid on the imported material used in the manufacture, less the legal retention of 10 per cent., the quantity of the material so used being determined by adding to the net weight of the exported nails 7½ per cent. of such net weight."

The sum of \$10,000,000 has been raised for the Roman Catholic University at Washington, and work on the buildings has commenced.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington street, CHICAGO, December 24, 1888.

Pig Iron.—Car-Wheel manufacturers are in the market for Charcoal Pig Iron, and one of them has already contracted for his supply for next year. In view of the large quantity involved in this transaction it is understood that the buyer secured a concession of about \$1 per ton from current quotations. Other Car-Wheel manufacturers are sounding the market, but seem inclined to defer their purchases, in the belief that prices will be lower. Manufacturers do not coincide in this view of the situation, as there are large contracts for Charcoal Pig Iron still on their books to be filled, and it will require but a few good orders like the one just placed to stiffen the vertebrae of sellers disposed to make concessions. Regular quotations of Lake Superior Charcoal Pig Iron are \$20 for Nos. 1 and 2, and \$20.50 for the higher numbers. Alabama Car-Wheel remains firm at \$26.25. In Soft Coke Irons but little business is reported. Jackson County Softeners are quoted at \$18.60 for No. 1, but buyers refuse to pay this price, substituting cheaper Irons. American Scotch (Blackband), No. 1, is held at \$19.50 @ \$20.50, but these are nominal quotations, as most of the furnaces are sold ahead and are out of the market at present. Hocking Valley and other Ohio Soft Irons are quoted at \$17.50 @ \$18. A considerable quantity of Lake Superior Coke Iron has been sold, but the demand is for small lots only, buyers being indisposed to anticipate their needs. The prices named for this Iron are \$17.50 @ \$18 for No. 1, \$16.50 @ \$17 for No. 2, and \$15.50 @ \$16 for No. 3. The nominal quotation for Coke Bessemer is \$17.50, but a very large sale has recently been made on private terms by one Steel company to another. In Southern Iron but little business is reported, and while some companies maintain a firm front others are quite willing to shade prices to secure orders. Current quotations on this class of Iron are now about as follows: No. 1 Coke Foundry, \$17.25; No. 2 Foundry and No. 1 Soft, \$16.25; No. 3 Foundry and No. 2 Soft, \$15.75; Gray Forge, \$15.50; Mottled \$14.75. All the above quotations are on a cash basis, f.o.b. Chicago.

Bar Iron.—Large orders have been rare during the week, but quotations are being maintained with remarkable unanimity at 1.72½¢ @ 1.75¢, half extras, f.o.b. Chicago, for mill lots of Common Iron. Store prices are unchanged at 1.90¢ @ 2¢, according to quantity and quality.

Structural Iron.—Business is quiet, as is usual at this season. Orders being scarce and mills more anxious for work, prices are weaker, particularly for Angles and Plates. Jones & Laughlins deny the truth of the report that the Chamber of Commerce contract was taken at less than the combination price for Beams, but some of their competitors are so chagrined at being beaten that it would not be surprising if prices were cut on the next large Beam order on the market. Nominal quotations on mill lots are as follows, f.o.b. Chicago: Angles, 2.15¢; Universal Plates, 2.20¢ @ 2.25¢; Tees, 2.55¢ @ 2.60¢; Beams and Channels, 3.40¢. Store prices are as follows: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—Some desirable mill orders for Plates were placed during the week, and prices were slightly cut, showing that the mills are not so full of

orders as they have been. The demand for small lots has been fair. Store prices are as follows: Heavy Iron Sheets, Nos. 10 to 14, 2.60¢ @ 2.70¢; Steel Sheets, 3¢ @ 3.50¢; Tank Iron, 2.55¢ @ 2.65¢; Tank Steel, 2.75¢; Shell Iron, 3¢; Shell Steel, 3.12½¢; Flange Iron, 4¢; Flange Steel, 3.50¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢. Boiler Tubes, 60 % and 62½ % off.

Sheet Iron.—The demand for Black Sheets is hardly so great as it has been, but, with the exception of Stove Pipe and Tinniers' Irons, it is still very strong. Galvanized Iron is fully as active as previously reported, telegraphic orders being quite numerous, showing the urgency for supplies among consumers. Small lots of Black Sheets are firmly held at 3.10¢ for No. 24; 3.20¢ for Nos. 25 and 26, and 3.30¢ for No. 27, while Galvanized is unchanged at 60 % and 5 % off for Juniata and 60 % and 10 % off for Charcoal. Mill lots of Black Sheets are now selling at 3¢ and 3.02½¢, f.o.b. Chicago for No. 27.

Merchant Steel.—In Tool and other high-grade Steels very little is doing at present, as the end of the year is approaching, and most consumers are letting their stocks run down before inventory. Bessemer Bars are variously quoted, some manufacturers offering them at 1.80¢ @ 1.90¢ on the Iron classification, while others ask 2.10¢ @ 2.15¢, Steel classification. The extras are being adhered to more strictly than the extras on Bar Iron. Store prices for the principal grades of Steel are as follows: Bessemer Bars, 2.30¢; Tool Steel, 8.50¢ @ 9.50¢; Specials, 13¢ @ 25¢; Crucible Spring, 3.75¢; Open-Hearth Spring, 2.50¢; Open-Hearth Machinery, 2.40¢ @ 2.75¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Matters have been harmonized between the Pittsburgh and Chicago mills, prices are being maintained on a basis of \$28 and \$30 at mill, respectively, and the parties interested are looking for an advance before a decline. The 17,000-ton contract for the Union Pacific Railroad, which was taken by Carnegie Bros. & Co., has been transferred to the North Chicago Rolling Mill Company, who will fill it at the price at which it was first placed, but who will take no more orders at the same rate, which is the lowest thus far made by any Western mill. The transfer of this contract has helped to put the trade in better shape. Orders for about 25,000 tons were placed by Western railroads during the past week, a considerable portion of which went to Pittsburgh by consent, including one order for immediate delivery and another order for delivery in the last half of next year.

Old Rails and Wheels.—Last week decided dullness in Old Rails followed the activity of the previous week, when several thousand tons of Iron Rails were sold in separate lots at prices ranging from \$22.50 to \$23, Chicago, and others were sold at \$23 in the interior of the State. The supply is getting more abundant in some parts of the country, particularly in the South, and bids are being solicited on a considerable quantity now available. The nominal quotation at Chicago is \$23, in the absence of sales, but a firm offer of \$22.50, and probably of \$22, would be accepted by some holders. Old Steel Rails command from \$15 to \$20, according to length and selection, freedom from Frogs, &c. Quite a demand exists for second-hand Rails of light sections from 12 to 40 lb, for relaying for light traffic in lumber regions, coal mines, &c. The demand for Old Car-Wheels is improving; 1000 tons are reported to have been sold recently at \$19.25, while an offer of \$19.35 for another 1000 tons was refused.

Scrap.—This material has moved in line with Old Rails, an active week having been succeeded by a very quiet one. Some sales of No. 1 Wrought have been made, but in other lines the movement has been limited. Mixed Foundry Scrap is worth \$15. Quotations for carefully selected Scrap are as follows per ton of 2000 lb: No. 1 Railroad Wrought Scrap, \$21.25 @ \$21.50; No. 1 Wrought, from city dealers, \$21; Track Scrap, \$20.25 @ \$20.50; No. 1 Mill, \$15 @ \$16; No. 2 Mill, \$10.50 @ \$11; Horseshoes, \$20; Axles, \$26.50 @ \$27; Pipes and Tank, \$13; Cast Machinery, \$14 @ \$15; Stove Plate, \$11.50; Borings, \$10 @ \$10.50; Turnings, \$11 @ \$11.50; Axle Turnings, \$13; Mixed Steel, \$12 @ \$13; Coil, Leaf and Tire Steel, \$16.

General Hardware.—The activity in Shelf Hardware continues, and the business transacted in this month is now fully as large as that of any December in ordinary years. The demand for goods is still of a general character, showing the healthy condition of the retail trade. Toys have naturally been in very heavy request, but Skates and Sleds have moved more slowly than usual at this season, because of the remarkable mildness of the weather, very little ice or snow having made its appearance in this locality up to the present. Steel Goods have been advanced to 65 % and 5 % to the general trade, but no other change has occurred worthy of note. In Heavy Hardware a better trade is reported, but business is still unusually dull with most jobbers. Good winter weather is earnestly desired by them.

Nails.—The course of the Wire Nail trade is strangely at variance with that of the Cut Nail trade. While prices of Cut Nails are now firmly held, and a marked upward tendency is perceptible, at least on the part of manufacturers, a decided break has occurred in Wire Nails, and factory prices are all at sea. The demoralization of the Wire Nail trade has taken place most inopportunistically, as the large stocks held by jobbers have about been exhausted, and it would appear that the conditions were favorable for the maintenance of prices. If jobbers had been compelled to pay the regular rate for new stocks they would no longer have been able to sell at manufacturers' prices, and business in this line would have been established on a substantial basis. This is what the Wire Nail manufacturers have been waiting for, and it is very strange that they should destroy their hopes of remunerative business just when the fulfillment of their plans was in sight. Large sales of Wire Nails have been made at cut prices, and a restoration of rates, if again attempted, will merely result in another season of weary waiting for the exhaustion of stocks in second hands. A theory is current that the break in prices was made by the combination for the purpose of forcing into line the few manufacturers who have refused to join and who have quietly been selling Wire Nails at rates a little under those fixed by the association, thus securing a fair amount of business while the other manufacturers were doing little or nothing. The manufacturers of Cut Nails are beginning to receive renewed inquiries, and are making some sales at the advance recently established. A possible advance to be made in January, which is now freely predicted, is having its effect upon those who have not arranged for all the Nails they will need. Notwithstanding the assertions made to the contrary when the manufacturers were booking heavy orders in the early part of the month, it now transpires that many of the Cut Nails then sold will be delivered in the future, as the principal makers are announcing that their capacity is covered well into March. An attempt was made by the local jobbers to advance the price of Steel Nails in small lots to \$2.10, but while

some of them are endeavoring to maintain that rate others are selling at \$2, and on combination orders even this price has been shaded. The regular price of carload lots on track is \$1.95. Small lots of Wire Nails are still being sold at \$2.60, but a good movement is occurring in mixed carloads at \$2.55. Jobbers are having a very good demand for both kinds of Nails, and are selling carload lots very freely.

Barb Wire.—The condition of this branch of trade shows no improvement either in demand or prices, but an early resumption of activity is looked for. The merchants must soon stock up for spring trade if they expect to do any business, and it will be remarkable if prices do not then advance, as so many buyers will be in the market at once. A few heavy dealers are taking time by the forelock and arranging for their season's supply, but manufacturers generally are not anxious to sell for future delivery. Small lots of Painted are quoted at 2.90¢, and Galvanized at 8.60¢, with the usual difference on carload lots.

Pig Lead.—A quiet week is reported, sales amounting to only about 400 tons, at 3.55¢. At the close 3.50¢ was bid, but no anxiety to sell is shown on the part of refiners. Consumers claim to have supplies which will carry them well into the coming year.

Pickands, Brown & Co., 115 Dearborn street, Chicago, have been appointed sole agents for the Northwest for the Hinkle Furnace of the Ashland Iron and Steel Company, at Ashland, Wis., manufacturing Lake Superior Charcoal Pig Iron.

The North Chicago Rolling Mill Company are now manufacturing Iron Car-Truck Channels at Milwaukee, Wis. They make 10½ and 12-inch Channels and have received a number of orders for them from car builders. The Springfield Iron Company, of Springfield, Ill., have also decided to resume the manufacture of Iron Car-Truck Channels, in view of the demand for them which is springing up.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., December 24, 1888.

Pig Iron.—It is almost impossible to form any definite opinion of the market at present. Reports are so contradictory that one hardly knows what to believe. There is a probability, however, that a good deal of business has been done in a quiet way, and as the details are harder than usual to get at, the presumption is that some concessions have been made, although leading sellers claim that they have made "no change in prices." There are others, however, who would be very glad to take business at inside quotations, but as yet without meeting much of a demand. Hence there is reason to believe that if the larger buyers have placed orders as stated, there must have been some inducements held out to secure their business. Or it may have been done in that very indefinite way called "price at time of delivery," which, as a matter of fact, looks as though buyers were not satisfied with prices quoted to-day. Be that as it may, there is really nothing in the position to warrant expectations of important changes in either direction. Consumption is so large, and reports from the South and West are all so favorable, that there is a fair probability that even the present large output may be taken without affecting prices. An advance is in the meantime out of the question, although even that might come, toward spring, providing that accumulations during the next three or four months are

not too large. On the other side, it is claimed that cost is again increasing, and that there is no money in the business at to-day's prices, while not a few are losing on every ton of Iron they sell. For the present, therefore, the outlook is exceedingly doubtful, as there is not enough evidence on either side to enable impartial observers to form any decided opinion either way. There is plenty of business and plenty of Iron; the question is, Will they continue in as fair proportion as they have been during the past six months? Will there be business enough to absorb the increased output of Iron? The next 30 days will doubtless supply an answer to this question. Meanwhile there are liberal offerings at \$18 @ \$19, at tide, for No. 1 Foundry, \$17 @ \$17.50 for No. 2 and \$16 @ \$16.50 for Gray Forge. Some sellers say they find very little business at inside rates, while others claim that they are abundantly supplied with orders for January and February on same terms as ruling during the past three months, and are quite indifferent about increasing their lines unless at full quoted rates.

Monday Evening.—There has been decidedly more inquiry to-day, and bids at 50¢ reduction for round lots February and March deliveries have been declined. Sellers express a willingness to shade 25¢ for deliveries to commence at once, but would rather carry the Iron themselves than allow the reduction asked for. On the whole, it seems as though buyers and sellers were getting closer together, and a great deal of business is likely to be arranged for during the next four or five days. Sellers show more confidence than they have done for some time past, as they think there are indications of large consumption soon as the mills start up on the new year's business.

Speigeleisen.—A sale of 1000 tons, 20 %, is reported at \$26.75, ex-ship, New York, duty paid.

Blooms.—A very unsettled market is reported in Steel Blooms, with somewhat heavy transactions at prices lower than have been mentioned for some time. Prices about as follows: Nail Slabs, \$28.50 @ \$29, at mill; Billets, \$31 @ \$35, with sales of 1000 tons for Boiler Plates at about \$36, delivered at consumers' mills; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 @ "bloom" ton of 2464 lb.

Manufactured Iron.—A great many inquiries have been made within the past few days, some of which have already resulted in business, while others are likely to do so before the close of the week. The outlook has materially improved, and prospects for full employment at the mills are now considered pretty well assured. These inquiries represent all classes of consumers, and include specifications for Bars, Plates, Skelp, Shapes and other material. The matter of prices is a little unsettled yet, and while in some instances low figures have been mentioned, the general feeling is to get back to the rates ruling four or five weeks ago. It should not cause surprise, however, if some orders are booked at low prices, as there are a good many mills anxious to get work to start the year with, and until these are out of the way it is hardly to be expected that prices will show much improvement. The feeling is very hopeful, nevertheless, much more so than it was two or three weeks ago, and there is reason to believe that the coming year will open with plenty of business, steady prices, and fair prospects of further improvement as the season advances. Quoted prices to-day are about as follows: Best Refined Bars, 1.8¢ @ 1.9¢; Grooved Skelp, \$1.85 @ \$1.90; Plates, 2¢ @ 2.10¢; Steel do., 2.2¢ @ 2.35¢ and Angles, 2¢ @ 2.1¢.

Steel Rails.—There is a better feeling in the market, and manufacturers begin to see their way to several good-sized orders at an early date. Prices are quoted \$28 at mill, although a sale was made to-day at a price seemingly below that, but it is said that the cut was in freight and not in the price of Rails.

Louisville.

LOUISVILLE, KY., December 24, 1888.

Pig Iron.—Among smaller consumers buying has been confined to carload lots. There have been heavy purchases made by Pipe and Car companies; one of 12,000, another of 2000 tons of Iron for future delivery. Iron is selling very low, there being no stability to the market, buyers being able to set prices. It is felt, however, that in January a change will take place showing some improvement. Inquiries are numerous for Iron for future delivery, and unless the market is demoralized heavy purchases will be made during the coming month. Among the Car companies there is a strong demand for Car-Wheel Irons owing to new contracts having been made which will insure work for some time to come. We quote as follows:

Southern Coke, No. 1 Foundry, new classification.....	\$15.50 @ \$16.00
Southern Coke, No. 2 Foundry, new classification.....	15.00 @ 15.75
Southern Coke, No. 3 Foundry, new classification.....	14.50 @ 15.00
Gray Forge.....	14.00 @ 15.50
White and Mottled, different grades.....	13.50 @ 14.00
Silver Gray, different grades.....	13.75 @ 14.50
Southern Charcoal, No. 1 Foundry.....	16.50 @ 17.00
No. 1 Mill.....	15.25 @ 15.75
Southern Car-Wheel, standard brands.....	22.50 @ 23.50
Southern Car-Wheel, other brands.....	18.50 @ 20.00
Hanging Rock Coke, No. 1 Foundry.....	16.00 @ 16.50
Hanging Rock Charcoal, No. 1 Foundry.....	20.00 @ 21.50
Hanging Rock, Cold Blast.....	21.25 @ 24.25
Hanging Rock, Warm Blast.....	@

Detroit.

WILLIAM F. JARVIS & Co., under date of December 24, report as follows: Business for the past week has been very quiet, and the lack of buying is attributed mainly to the near approach of the holidays. There seems to be a general determination on the part of buyers to wait until after the 1st of the year. Several small sales have been made, but none of any magnitude. While the majority of sellers are holding firm, yet the few who have offered concessions have caused buyers to expect the same from others. With a dull market, but prices generally firm, we quote as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.75 @ 20.25
Lake Superior Coke, cinder mixed.....	18.00 @ 18.50
Standard Ohio Black Band.....	19.75 @ 20.25
Southern No. 1.....	17.75 @ 18.25
Southern Gray Forge.....	15.75 @ 16.25
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	20.25 @ 20.75

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, December 24, 1888.

Pig Iron.—Nothing has occurred during the week to change the market, the supply and demand being about equal. Some consumers are claiming that the small increase of stocks of Iron on hand indicate a lower scale in prices in the near future, but this increase could not be other than expected so near the close of the year, and it remains to be demonstrated if these predictions prove true. So far as the Southern furnaces are concerned the demand has kept up remarkably well, and there are but few furnaces in the Southern district that are not well filled up with orders that have been taken at past prices and who have a regular set of customers

that it would take something besides a slight falling off in prices to induce them to seek other sources for their supply. At present there are large lots of Iron going East, some of them under old contracts and some under new, at prices that have ruled for the past month or two. There is no concession in prices reported, and while trade for the past 30 days has not been quite as active as previously, the call for shipments early in the coming year strongly indicates that the demand will be more than fully made up in January and February, and so far no reason can be assigned why quotations should be changed. The Southern steamship associations have affirmed the December rates to northern and western points for the month of January, with the exception of a reduction of 84 cents to Kansas City, Leavenworth, Atchison and St. Joseph. The present rates from Chattanooga and Birmingham are \$3.75 to Philadelphia and New York and \$4 to Boston.

Cleveland.

CLEVELAND, December 24, 1888.

Iron Ore.—The amount of unsold Ore on the docks at lower lake ports has been reduced to about 90,000 tons. Lots of from 2000 to 6000 tons of non-Bessemer Ores have been sold at about \$4.60. The amount of unsold Ores on the dock includes a round lot of high-grade Bessemer, which, although held at a fancy price, is likely to be sold immediately after the holidays. Indications are not lacking of a slight advance all round in next year's prices, and it is now thought probable that sales for next season's delivery will be made before January 10. The advance will probably not exceed 50¢ per ton over the prices prevailing at the opening of navigation this year. About 30,000 tons of Ore have been sent forward to the furnaces during the past week, and the docks will be entirely cleared up before next year's shipping season from the upper lakes begins.

Pig Iron.—The market has been very quiet for the past week, a condition always looked for in the holiday season. Some disposition has been manifested by a few sellers anxious to reduce their stocks to make concessions, but this has only been done by the smaller dealers. A large majority of manufacturers are, however, holding their products firmly at former quotations, preferring to carry their Irons over into January, when a livelier buying movement is anticipated. Mill Irons are still the favorites in the market, although just at present no important sales are reported.

Old Rails.—Buyers are waiting for a break in the market before making purchases in any considerable quantity, sellers still demanding \$24.50 @ \$25 for Old American Rails.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. (CINCINNATI, December 24, 1888.)

Pig Iron.—The changes in the local Pig Iron market, during the week, have been unimportant. The volume of business has been of reduced proportions, the Christmas tide rising so high as to discourage both buyers and sellers in their efforts to do business, yet the volume of transactions has been fully equal to the average at this season. Individual sales have been mostly small, but there have been several orders for 1000-ton lots of both Foundry and Forge grades. The easier feeling noted a week ago has not given place to further weakness, nor yet has it been succeeded by a firmer tone. It is observable that a few furnaces are still

disposed to sell, and this implies concessions in prices, but the majority are not pressing their production, and the ranges of prices remains about the same as a week ago.

Foundry.

Southern Coke, No. 1 (new classification).....	\$16.25 @ \$16.75
Southern Coke, No. 2 (new classification).....	15.50 @ 16.00
Southern Coke, No. 3 (new classification).....	15.00 @ 15.25
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	18.00 @ 18.50
Hanging Rock Charcoal, No. 1.....	21.00 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.....	17.50 @ 18.00

Forge.

Strong Neutral Coke.....	15.00 @ 15.25
Mottled Neutral Coke.....	14.00 @ 14.25
Gray Forge.....	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 25.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	21.00 @ 22.00

Manufactured Iron.—There has been a moderate demand only during the week and prices of standard and reliable makes have been unchanged.

Old Material.—There has been little trading during the week and prices are nominally unchanged. Old Rails are quotable at \$23 and Old Wheels at \$19 @ \$19.50 per ton, cash, Cincinnati.

Nails.—There has been a moderate jobbing demand, which has been met readily at previous prices.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave., (PITTSBURGH, December 24, 1888.)

A good many mills have about all they can do working up old contracts. It is customary with a good many Iron firms to take stock and make needed repairs in January, and it is expected that quite a number of mills will shut down this week and remain so until about the middle of January. The outlook for the year 1889 is very generally regarded as being favorable. Some are of the opinion that the volume of business will exceed that of 1888.

Pig Iron.—The market is in a rather peculiar condition, and it is difficult to report satisfactorily. While business men, generally, are hopeful of a stronger market early in the new year, some few contracts have been made for delivery during the first quarter of 1889 at a concession from present prices; others, however—and these are in the majority—are demanding an advance, but, as a matter of course, they are making no sales. Now that a few contracts have been made for delivery between January and April at prices from 25¢ to 50¢ per ton for immediate delivery, it is probable that business will be confined to supplying immediate wants, as there are very few furnacemen willing to contract ahead at the prices noted, and consumers, in view of what has been done already, will not feel like paying more. A good many furnacemen are averse to selling ahead from the fact that if the market goes up they are held up for the last pound, while if it goes the other way they claim that all kinds of tricks are resorted to in order, if possible, to get out of the same. One of our oldest furnacemen, in referring to this matter the other day, said that his experience in selling for future delivery was unsatisfactory, and that he has concluded hereafter to abstain therefrom. Some producers are of the opinion that the market is more likely to advance than decline, as they allege that cost of production is more likely to be increased than reduced; already Coke men are trying to

advance prices of Coke. We quote prices for present delivery as follows:

Neutral Gray Forge.....	\$15.75 @ \$16.00, cash.
White and Mottled.....	15.00 @ 15.50, "
All Ore Mill.....	18.25 @ 18.50, "
No. 1 Foundry.....	17.50 @ 17.75, "
No. 2 Foundry.....	18.75 @ 17.00, "
No. 1 Charcoal Foundry.....	24.00 @ 24.50, "
No. 2 Charcoal Foundry.....	22.00 @ 22.50, "
Cold Blast Charcoal.....	25.00 @ 28.00, "
Bessemer Iron.....	17.00 @ 17.25, "

There were sales reported of 1300 tons Gray Forge for immediate delivery at \$16, cash; 1500 tons do. for January and February delivery at \$15.50, cash; 2000 do. for January, February and March at \$15.50, cash; 1000 tons Bessemer at \$17.05, cash; 1000 do. \$17.25, cash, and 1000 for February and March at \$17, cash.

Muck Bar.—There is less inquiry, and the market is weaker; we now quote at \$28.75 @ \$29, cash, with a sale of 500 tons reported at \$29. Consumers report that they have no trouble in buying all they want at \$29, cash.

Manganese.—Sales Ferromanganese 80 % at \$54.50 @ \$55, cash; and Spiegel 20 % at \$28 @ \$28.50, cash.

Manufactured Iron.—There is but little new business at present, nor is it to be expected with the close of the year so near at hand. Prices remain about as last quoted, although for a desirable order they might be shaded somewhat. Bars, \$1.80 @ \$1.85; Plates, \$2.10 @ \$2.25; No. 24 Sheet, \$2.80 @ \$2.90, all 60 days, with the usual discount of 2 % off for cash.

Nails.—So far as relates to Pittsburgh, business is very dull, with but little prospect of any immediate improvement.

Wrought-Iron Pipe.—The Pipe trade continues dull, as it usually is at this particular time, and there is not likely to be much if any improvement for some time to come. Not only is business exceedingly light, but it is very unsatisfactory, as prices are being cut to such an extent that there is little or no margin for profit. A meeting of manufacturers is reported to have taken place in Philadelphia the other day, but if so its object and results have not yet been divulged. What is wanted is organization and co-operation, and until there is, no substantial improvement can be looked for. The great trouble in the way of an organization is a lack of confidence in each other on the part of the manufacturers. Prices are so irregular at present that it is impossible to give reliable quotations. There are but few orders offering, and as a consequence whoever gets these has to shave close.

Old Rails.—There is not much doing, but it is expected that there will be an increased demand early in the new year, as a good many consumers are low in stock, and will soon have to replenish. We continue to quote American Tees at \$25 @ \$25.25, with a sale of 1500 tons reported at \$25.25.

Steel Rails.—Are still quoted at \$28 cash, at works in Pittsburgh, but it is possible that for a desirable order the price quoted would be "cut" somewhat, notwithstanding it is claimed that \$28 is now the bottom price, and it is claimed that there is no margin below the price quoted.

Billets, &c.—There is but little inquiry for Bessemer Steel Billets, and the market is weaker. We now quote \$28.25 @ \$28.50, cash. Sales at \$27.90, cash; Domestic Steel Bloom Ends and Rail Ends unchanged at \$19 @ \$19.50.

Railway Track Supplies.—Prices remain unchanged. Spikes \$2.15, 30 days; Splice Bars, \$1.80 @ \$1.85; Track Bolts, \$2.80, with Square, and \$2.90 with Hexagon Nuts.

Old Material.—The demand for everything in this line continues light, but is expected to improve early in the new

year. Prices unchanged. No. 1 Wrought Scrap, \$21 net ton; No. 1 Wrought Turnings, \$18.50 @ \$14; Car Axles, \$25 @ \$26; Cast Scrap, \$15.25 @ \$15.50, gross; Cast Borings, \$12 @ \$13; Old Car-Wheels, \$19.50 @ \$20; Old Steel Rails, store prices, \$18.50; long lengths, \$20.50.

New York.

Office of *The Iron Age*, 66 and 68 Duane street.
NEW YORK, December 26, 1888.

Foundry Pig.—The week has been quiet, no announcement having been made as yet of the opening prices. In some quarters the opinion is being expressed that the aggressive character of Southern competition may lead to a lowering of prices by about \$1. It is intimated, however, that the leading interests may reach an understanding whereby cutting may be avoided. Some Southern Iron has been sold at \$17.50 for 1889 delivery, and some transactions have been closed, the price to be dependent upon the market at time of delivery. We quote No. 1 Foundry, \$18 @ \$19 and No. 2, \$16.50 @ \$17.50.

Scotch Pig.—During the past month considerable Scotch Pig has sold for delivery during the early months of 1889. We quote: Coltness, \$20.50 @ \$21; Shotts, \$20.25 @ \$20.75; Langloan, \$20.25 @ \$20.50, and Dalmellington, \$19.50 @ \$19.75.

Spiegeleisen.—We quote \$26.75 @ \$27 for 20 %, and \$54 for 80 % Ferro.

Plates.—We quote Iron Tank, 2¢ @ 2.2¢; Shell, 2.25¢ @ 2.4¢; Steel Tank and Ship Plate, 2.15¢ @ 2.25¢; Shell, 2.35¢ @ 2.5¢; Flange, 2.6¢ @ 2.75¢, and Fire-box, 3½¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2¢ @ 2.10¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢ on dock for all sizes. Foreign Beams are quoted 2.55¢ @ 2.75¢.

Bar Iron.—We quote: Carload lots on dock, half extras, Common, 1.7¢ @ 1.75¢; Medium, 1.75¢ @ 1.8¢, and Refined, 1.8¢ @ 2¢.

Steel Rails.—The market is quiet and steady, sales during the week being confined to a few small lots. There is considerable inquiry from the South, there being at least three blocks in the market for 10,000 tons and upward each. It is persistently asserted that \$28 at Eastern mill is being cut, and as steadily denied.

Merchant Steel.—The market continues in a demoralized condition. As an instance of it, it is reported that 500 tons of Harrow Steel were sold to a Western consumer at \$43 ½ ton, 3 % off, delivered, with the option of taking 500 tons more. Tire Steel has sold at 2.05¢, delivered, in the West, and 2.15¢ has been done for all sizes.

Wire Rods.—Cheap sellers in Germany are reported to be filled up for the present, and importers claim that they cannot secure Rods and deliver them here under \$41 @ \$41.50. No business has been done at anything higher than \$39.50 thus far.

Old Rails.—No transactions are reported. A lot of 500 tons is offered at \$23.50 from store, with the probability that \$23.25 will secure it.

Rail Fastenings.—The market for Spikes is weaker, quotations having declined to \$2.10 @ \$2.15, delivered. Angle Bars are selling at 1.85¢ delivered.

The Pump Manufacturers' Association held a meeting at the Grand Pacific Hotel, Chicago, on Wednesday and Thursday of last week. It was decided inexpedient to

form a trust or pool, but it was agreed that the low prices which have heretofore prevailed necessitated a revision of discount sheets. By unanimous vote of the association the price of iron pumps was advanced 2 per cent. The following officers were elected for the ensuing year: President, H. M. Wade, Batavia, N. Y.; vice-president, P. W. Bailey, Seneca Falls, N. Y.; treasurer, M. L. Bailey, New Britain, Conn; secretary, L. L. Morrison, New York.

Financial.

The most important news of the week is the confirmation of the reports of an agreement among the railway systems of the Southwest by which rates are to be restored to a remunerative basis. Not only this, but there is evinced a determination not only to advance rates but to maintain them, and at the same time conform strictly to the requirements of the Interstate Commerce law. The special feature that particularly distinguishes the new arrangement from any that has preceded it for many years is the harmonious co-operation of railroad presidents and leading financiers in effecting the result. The presidents will meet again directly after the holidays to perfect the plan, of which the present agreement will be the basis. It is distinctly understood that this agreement is a temporary one, being for 60 days. Another forward step to the same end is a decision by the general managers, at a meeting held in Chicago on Saturday, to restore Western and Southwestern freights January 1st. The principal changes are in rates on packing-house products and live stock, which have been long demoralized.

The Stock Exchange markets have been influenced by the improved railroad situation, nevertheless there is little substantial gain, the movement being irregular and at times feverish. The strongest were the coal stocks, especially Lackawanna, which shows remarkable gains. Rock Island advanced in spite of the reduction of its quarterly dividend from 1½ to 1 ¢. On Saturday, under the combined influences of an unfavorable bank statement and a sharp break in Omaha preferred, a fractional recession in prices was recorded. A drop of ¾ points in Omaha preferred was a surprise. On Monday stocks were buoyant, in the belief that the new freight rate agreement would be maintained.

United States bonds were firm and in good demand, and railroad bonds were higher. Quotations are as follows:

U. S. 4½s, 1891, registered.....	108¼
U. S. 4½s, 1891, coupon.....	108¼
U. S. 4s, 1907, registered.....	127
U. S. 4s, 1907, coupon.....	128
U. S. currency 6s, 1896.....	119
U. S. currency 6s, 1898.....	122
U. S. currency 6s, 1897.....	125
U. S. currency 6s, 1898.....	127½
U. S. currency 6s, 1899.....	130

The total amount of bonds purchased to date under the circular of April 17 is \$100,829,300, of which \$51,396,650 are 4 % and \$49,432,650 are 4½ %. The cost of these bonds was \$119,402,568, of which \$66,010,877 was paid for the 4s and \$53,391,691 was paid for 4½s. For some weeks past the offerings of 4½s have been almost exclusively from banks or financial corporations and brokers.

Money has a hardening tendency, in anticipation of the annual settlements and shifting of loans usual at this season, but an easier feeling soon after the new year has fairly opened is confidently looked for, as large amounts will be released in the payment of interest and dividends. Institutions marked up their loans 4 @ 5 %. The demand for 30 to 60 day time loans was unusually strong. Rates were 4 to 4½ % for three months or less, and 5 to 6 % for four to six months. Commercial paper was in limited supply, the demand being fairly good and coming mainly from out-of-town sources. Rates were for 60 to 90

days' indorsed bills receivable 5 to 5½ %, longer dates 6 @ 6½ %. It is remarked that the condition of banking affairs throughout the country is remarkably favorable, and respecting the National banks Comptroller Trenholm says they have never been sounder or under better management.

According to the Custom-House report the exports of specie from New York during the week were \$1,428,325, making the total since January 1 \$45,515,000, against \$18,082,000 for the same time last year and \$47,000,000 in 1886. The imports of specie for the week were \$257,000; total since January 1 \$7,805,000.

The weekly statement of the associated banks of this city shows a heavy decrease of reserve, equal to \$2,297,600, reflecting the recent exports of gold and the large shipments of currency to the South and West, chiefly for the movement of cotton. The surplus now held is \$7,574,625, against \$9,036,400 at the corresponding time last year and \$7,232,200 in the fourth week of December, 1886. This is the first time in a number of months when the surplus of reserve has fallen below the amount of the year previous, but it occasions no anxiety. The changes in the averages show an increase in loans of \$1,513,500, a decrease in specie of \$1,355,200, a decrease in legal tenders of \$1,513,200, a decrease in deposits of \$2,283,200, and a decrease in circulation of \$83,000.

The market for sterling was quiet and steady. The leading bankers are not looking for a further export of gold immediately. Posted rates for sterling were \$4.85 @ \$4.89½. On the Paris Bourse the week prices were notably firm, considering the Panama Canal collapse, and closed strong owing to extensive re-buying by leading financial firms.

General trade is quiet, aside from the temporary spurt caused by holiday demands. The staple commodities are nearly all weaker, particularly flour and wheat. The best patent spring wheat flour is offered in London at prices relatively much lower than here. Corn was in better demand for export. Sugars were dull, and coffee had a downward tendency. Cotton was much more active at a decline, based on estimates of a large yield. The dry goods market is in an unusually good shape, promising strength in the future.

The importations of merchandise at this port during the week were \$7,102,000, of which about \$5,000,000 represent general merchandise. Since January 1 the aggregate is \$451,272,000, against \$456,480,000 for the same time last year.

The east-bound shipments from Chicago last week were phenomenal. The Board of Trade statement shows an aggregate for all the roads of 111,000 tons, against 108,000 for the preceding week, and 54,000 tons for the corresponding week last year. This is the largest volume of east-bound business for a single week on record.

Metal Market.

Copper.—Friday's London quotations showed no change and since then there have been none; they were for spot Chili Bars, £77. 10/; do., futures, £78; good merchantable brands, £77. 10/; spot, and £78, futures, and Best Selected, £80. Sales, 375 tons. Hardly anything has transpired here, the nominal range for spot and December being 17.20¢ @ 17.50¢ for Lake. The Lake companies, headed by the Calumet and Hecla, which, it is stated, conceived the new plan, are said to have made the syndicate the proposition to pay them all alike—14¢ ¾ lb outright, instead of 13¢ and 50 % of the figure over this, which would simplify accounting and expedite the same. It is believed the syndicate would accede

to this, leaving it free to advance the price to a point that may increase the profit without curtailing consumption still further. The fact is that the statistics are getting worse all along, the visible supply on December 17, in England and France, being 98,880 tons, against 95,840 tons on December 1 and 45,130 on December 1, 1887, without counting some 2200 tons afloat from England to the Continent. Hence, the visible supply may be figured at something like 100,000 tons on the other side; and, adding thereto 30,000 tons on this side, it will be found that £9,100,000 are thus held in one hand, or, reduced to American gold, \$45,500,000 or thereabout, a mighty amount. With the Rio Tinto Company the syndicate's contract has been extended to 1902.

Tin.—The London quotation remained unaltered last week. Straits, spot, £97. 2/, and futures, £98. Sales, 580 tons. Here only 10 tons, February, were sold at 21.85¢, and 20 tons, March, at 21.90¢ @ 21.95¢, the nominal quotation for spot and December being 21.70¢ @ 22¢ on 'Change, while in the open market spot is procurable at 21½¢, and in a jobbing way at 22¢ @ 22½¢. **Tin Plates.**—Nothing of any consequence has been done in either spot or futures. The last Liverpool quotation was 13½. We quote on a lifeless market at the close, large lines, ½ box: Siemens-Martin Steel, Charcoal Finish, \$4.75 @ \$5.50; Coke Finish, \$4.65 @ \$4.70; Terns, \$4.12½ @ \$4.25; Coke Tins, \$4.22½ @ \$4.30; and Wasters, \$4.12½ @ \$4.15.

Lead.—The market has been dull, not over 200 to 300 tons being sold at 3.70¢ @ 3.82½¢, closing at 3.75¢ @ 3.80¢, and strong. The fact is that very little Lead is offering, hence the firm tone in spite of the little doing. St. Louis quiet at 5.50¢. Soft Spanish improved in London from £12. 15/ to £12. 17/ since our last. The auction sale of 800 tons is postponed to January 3.

Spelter.—Sales have been restricted on the spot to trifling lots of Common Domestic at 5¢ @ 5½¢, while Silesian, unaltered—£18. 5/ in London—cannot be quoted any higher than 5.75¢ nominally.

Antimony.—There has been a fair demand, while the stock is light and the metal is strong at 13¢ Cookson and 11¢ Hallett, the latter still ruling at £45 in London.

New York Metal Exchange.

The following sales are reported:

WEDNESDAY, December 19.		
10 tons Tin, March.....	21.95¢	
10 tons Tin, March.....	21.90¢	
10 tons Tin, February.....	21.85¢	
FRIDAY, December 21.		
16 tons Lead, March.....	3.87½¢	
WEDNESDAY, December 26.		
10 tons Tin, spot.....	21.70¢	
20 tons Tin, March.....	22.10¢	

Coal Market.

The Anthracite Coal market is without any new feature whatever, excepting a firmer tone since the resolve to curtail production has taken effect. Reading refuses to make any concession in price, and the Lehigh Coals are sold close to the schedule. Stocks at all points are liberal. An enforced curtailment resulted from the drawing out of several collieries scattered throughout the mining regions. From Philadelphia it is learned that the furnace demand has improved, affording a ready market for all the larger sizes. The Murray shaft, at Wilkesbarre, Pa., operated by the Lehigh and Wilkesbarre Coal Company, suspended work and will be sunk deeper to a rich vein. The Baltimore and Ohio Railroad, under its new president, Chas. F. Mayer, aspires to become the largest producer of Semi-Bituminous Coal

in America. The schedule prices remain as before—viz., Hard White Ash, Lump, \$4.50; Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Free-Burning, f.o.b., Broken, \$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.65; Pea, \$2.75.

The Seaboard Steam Coal Association held another meeting in Philadelphia last week and agreed to articles for the regulation of the Bituminous trade during the ensuing year. All the Soft Coal interests shipping Bituminous fuel to tidewater on the Atlantic Coast were represented and entered into an agreement excepting the Beech Creek Railroad. Galloway C. Morris will continue to act during the coming year as the Association Commissioner. According to the articles of agreement each shipper will be required to pay into the pool 20¢ per ton for each ton of Coal shipped by his road, and it will be held by the Commissioner for four months. The tide-water tonnage to be pooled this year is estimated at about 5,000,000 tons.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from December 14 to December 20, inclusive, and from January 1 to December 20, inclusive, were as follows:

Iron and Steel.			
	Dec. 14. to Dec. 20.	Jan. 1 to Dec. 20.	
Iron Ore: A. Earnshaw.....	298	8,438	
Pig Iron: G. T. Carter.....	500	1,830	
N. S. Bartlett.....	200	5,700	
Crocker Brothers.....	200	15,584	
G. W. Stetson & Co.....	100	14,850	
Jas. Williamson & Co.....	100	5,700	
Jas. E. Pope, Jr.....	54	304	
Spiegelcisen: J. A. Jansen.....	400	12,072	
Crocker Bros.....	244	12,583	
Steel: Thos. Prosser & Son.....	55	275	
W. F. Wagner.....	31	1,512	
Montgomery & Co.....	22	115	
R. H. Wolff & Co.....	20	756	
Chas. Hugill.....	6	310½	
F. S. Pliditch.....	6	520½	
C. F. Boker.....	3	237½	
Steel Rods: R. H. Wolff & Co.....	250	4,186	
J. Abbott & Co.....	247	4,237	
J. A. Roebling Sons' Co.....	135	1,687	
A. Heyn.....	106	1,909	
Naylor & Co.....	75	19,252	
Cary & Moen.....	15	923	
S. A. Galpin.....	9	3,129	
Steel Blooms: W. H. Wallace & Co.....	174	174	
J. A. Roebling Sons' Co.....	105	105	
Steel Plates: A. R. Whitney & Co.....	2	33	
Steel Sheets: Pierson & Co.....	20	1,123	
R. Crooks & Co.....	6	366	
Iron: G. Lundberg.....	125	933	
J. Abbott & Co.....	45	7,525½	
Iron Rods: J. Abbott & Co.....	210	452	
Iron Beams: R. F. Downing & Co.....	10	339	
Sheet Iron: T. B. Coddington & Co.....	85	1,489	

Tin Plates.			
	Boxes.	Boxes.	
Dickerson, Van Dusen & Co.....	12,189	281,411	
Phelps, Dodge & Co.....	8,614	555,602	
T. B. Coddington & Co.....	6,882	175,089	
A. A. Thomsen & Co.....	4,059	164,227	
Bruce & Cook.....	1,953	102,464	
N. L. Cort & Co.....	1,325	114,395	
Lalanc & G. Mfg. Co.....	1,150	7,220	
Central Stamping Company.....	1,129	38,225	
Jas. Byrne & Son.....	1,118	37,449	
Lombard, Ayres & Co.....	1,085	16,310	
R. Crooks & Co.....	1,083	67,230	
Merchant & Co.....	733	25,061	
C. S. Mersick & Co.....	659	8,117	
S. Shepard & Co.....	437	21,155	
E. S. Wheeler & Co.....	190	11,695	
Pratt Mfg. Co.....	183	160,794	

Metals.			
	Pounds.	Pounds.	
Tin: Lehman, Sons & Co.....	14,091	180,806	
Antimony: Phelps, Dodge & Co.....	50	730	
Irons and Metals Warehoused from December 14 to December 20, Inclusive:			
Iron: G. Lundberg.....		50	
R. F. Downing & Co.....		40	

Hardware, Machinery, &c.			
Barbour Bros. & Co., Mach'y, pkgs., 32			
Boker, Hermann & Co., Arms, cs., 12; Mdse., cs., 7; Detonators, cs., 8			
Crabb, Wm. & Co., Mach'y, pkgs., 3			
Foley, Edward, Mach'y, pkgs., 33			
Folsom Arms Company, H. & D., Arms, cs., 5			
Gould, R. S. & Co., Brassware, cs., 2			
Graef Cutlery Co., Cutlery, cs., 9			
Koeling, Max, Ironware, cs., 17			
Russell & Erwin Mfg. Co., Mdse., pkgs., 4			
Schoverling, Daly & Gales, Arms, cs., 17			

Silcox, Geo. W., Mach'y, pkgs., 59
Smith, R. A. C., Mach'y, crate, 1
Smyth, Jas. P., Steel Cord Wire, cs., 25
Thebaud Bros., Bolts and Spikes, cs., 230
Zelner, Henry & Co., Brassware, cs., 25
Zelner & Feldstein, Brassware, cs., 18
Ward, Jas. E. & Co., Mach'y, cs., 7; Fly-Wheels, 2
Williams & Andrews, Anvils, 25
Wiobusch & Hilger, Lim., Mdse., pkgs., 25
Witte, John G. & Bro., Cases, 6; Cutlery, cs., 6

Exports of Metals.

	Dec. 14. to Dec. 20.	Jan. 1. to Dec. 20.	
Copper: J. Abbott & Co.....	119,577	13,252,107	
Lewisohn Bros.....		4,041,522	
F. A. Lomal.....		2,581,288	
American Metal Company.....	559,717	6,578,008	
G. H. Nichols.....		223,359	
J. Bruce Ismay.....		112,000	
S. Mendel.....		590,000	
Ledoux & Co.....		110,276	
Muller, Schall & Co.....		430,000	
Copper Queen Con. M. Com-pany.....		224,064	
J. Kennedy, Tod & Co.....		112,028	
H. Becker & Co.....		1,250	
Orford C. & S. Rfg. Company.....		449,861	
Robt. M. Thompson.....		125,000	
Thos. J. Pope, Sons & Co.....		1,451,130	
Williams & Terhune.....		99,220	
J. Parsons & Co.....		430,000	
Naylor & Co.....		448,809	
Jas. E. Pope, Jr.....		167,500	
Bridgeport Copper Com-pany.....		112,000	
C. Herold.....		250,000	
Phelps Bros.....		6,250	
Burgess & Co.....		51,840	
R. W. Jones.....		189,864	
Ladenburg, Thalmann & Co.....		229,971	
W. H. Crossman & Bro.....		4,000	
R. Crooks & Co.....		1,000	
Copper Matte: Williams & Terhune.....		38,339,096	
Lewisohn Bros.....		3,021,610	
American Metal Company.....	124,300	5,089,130	
J. Abbott & Co.....	105,736	443,155	
C. Ledoux & Co.....		959,806	
F. W. J. Hurst.....		184,288	
G. H. Nichols.....		722,777	
H. T. Nichols & Co.....		150,000	
Kunhardt & Co.....		41,662	
Old Brass: Burfass & Co.....	11,204	263,670	
Old Copper: Burfass & Co.....	41,041	720,353	

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Dec. 26, 1888.

Nearly all branches of the market for Iron and Steel have been quiet, as far at least as business for the past week is concerned. In Metals there has also been the quietude common to the holiday season, and comparatively little variation in prices. Steel makers note some exception to the rule in the instance of shipbuilding and railway sorts, and also in the demand for Billets, prices for which are very firm. Most brands of Scotch Pig have ruled very steady, as have also Hematites, despite the moderate demand; but Middlesboro' Pig has weakened a fraction under the influence of freer offerings and accumulations of supplies in makers' hands.

The situation in the Copper market has undergone no remarkable change, and business with consumers is still adversely affected by the artificial character of present prices. Consumers and smelters purchase only the supply they may need for covering necessary wants, and give "outside" brands the preference wherever practicable. Producers whose stock is not taken up by "syndicate" contracts offer freely, first to the trade and then to the "syndicate" if outlet is not found elsewhere.

The speculation in Block Tin has been moderate and reveals no new feature in the situation from any standpoint. The monthly sale of Billiton realized a parity of £97. 12/6 in Holland. Other metals have been traded in to a moderate extent only.

A fair reasonable business has been done in Tin Plate at previous rates. There is an encouraging demand for future deliver-

ies, and makers express confidence in better prices ruling soon after the holidays.

Scotch Pig.—Trade has been moderate, and prices show only slight variation. Glasgow freights are a shade firmer.

No. 1 Coltness, f.o.b. Glasgow	51/
No. 1 Summerlee, " "	50/
No. 1 Gartsherrie, " "	48/6
No. 1 Langloan, " "	49/6
No. 1 Carnbroe, " "	44/6
No. 1 Shotta, " " at Leith	49/6
No. 1 Glengarnock, " Ardrossan	48/
No. 1 Dalmellington, " "	43/6
No. 1 Eglinton, " "	42/

Steamer freights, Glasgow to New York, 3/, Liverpool to New York, 10/.

Cleveland Pig.—Demand has been moderate, and the market barely steady. No. 1 Middlesboro', G. M. B., 36/; No. 3 do., 33/.

Bessemer Pig.—Dealings have been on a more restricted scale, but prices have remained steady. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen.—The market rather quiet, but firm. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—Prices remain firm under the support of continued good demand. English sections quoted at £3. 19/ @ £4, and light sections £4. 2/6 @ £4. 10/, f.o.b. at N. W. England shipping point.

Steel Blooms.—Demand moderate and prices unchanged. We quote £3. 18/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—There has been a brisk demand and the market is strong. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—A moderate business at about former prices. Bessemer, £3. 18/6, f.o.b. at N. W. England shipping point.

Old Rails.—The market quiet and prices without change. Tees quoted at £3. 5/ @ £3. 7/, and Double Heads, £3. 8/ @ £3. 10, c.i.f. New York.

Scrap Iron.—Prices are as before and the demand moderate. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Crop Ends.—Moderate sales making at about previous rates. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—There has been a fairly good trade, and sellers are rather firmer. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/3 @ 15/6
IC Bessemer steel, Coke finish	13/6 @ 13/9
IC Siemens	13/9 @ 14/
IC Coke, B. V. grade	13/3 @ 13/6
Charcoal Terne, Dean grade	12/ @ 12/3

Manufactured Iron.—Business has slackened somewhat, but prices are held firmly throughout. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d. @ 8 2 6
" Common	5 12 6 @ 5 15 0
Staff. Bl'k Sheet, singles	@ 7 10 0
Welsh Bars (f.o.b. Wales)	5 0 0 @ 5 2 6

Tin.—Operations have been on a moderate scale and prices have varied slightly. Straits quoted at £97, spot, and £98 for three months' futures.

Copper.—Chili Bars firm but quiet. Other kinds slow and unsettled. Chili Bars, £77. 10/, spot, and £78, three months' futures. Best Selected, £74. 10/.

Lead.—There has been a better demand and prices are firmer at £12. 15/ for Soft Spanish.

Spelter.—The demand has continued fairly active and prices steady at £18. 2/6 @ £18. 5/ for ordinary Silesian.

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira	Cent.
Florin (Netherlands)	10.3
Florin (Austria)	30.2
Wreils (Portugal)	55.4
Wreils (Brazil)	54.6
Mark (Germany)	23.8
Kilogram	Pounds. 2.205
Picul	134.

BELGIUM.

BRUSSELS, December 15, 1888.—*Iron.*—Our market has remained firm. The official quotation for Forge Pig in Luxembourg remains 4.20 francs \approx 100 kg. Athus sold 21,800 tons of Pig, deliverable during the first quarter of next year. The price of Pig is now at a level, enabling rolling mills to execute a great many orders. Following are the quotations: Luxembourg Foundry Pig, 4.90; Charleroi do., 6.30; Forge, 4.70 @ 5.60; Merchant Iron, free on board Antwerp, No. 1, 11.50; No. 2, 12.25; No. 3, 13; Beams, do., 11.75; Angles, 12.50; Sheets, Nos. 2 to 4, 15 @ 24; Thin, 18; Steel, 17. Cockerill and Denain together furnish the Porto Rico railroads 12,000 Steel Rails, a French company 10,000 tons Steel Sleepers; these are French Ponsard Steel Sleepers. Cockerill also furnishes Queensland 2000 tons of Steel Rails, and our Government a new fast Steel steamer in the sum of 1,049,000 francs. This steamer makes 17½ knots per hour. For each one-tenth knot over 17 knots the Government pays Cockerill 10,000 francs additional.—*Moniteur des Intérêts Matériels.*

GERMANY.

HAMBURG, December 15, 1888.—*Iron.*—While Iron Ore has continued tending upward in Rhenish Westphalia, this has also been the case with Forge Pig, which is about 1 mark \approx ton dearer. Greater animation has been noticeable in Spiegel, which has advanced from 53 marks, 10 to 12 $\frac{1}{2}$, to 54. Luxembourg Forge Pig has remained sustained at 37.10 marks \approx ton. Finished Iron has been doing tolerably well for domestic use; for export it cannot be moved. Boiler works, foundries and rolling stock manufacturers are all of them doing remarkably well. Sets of Car-Wheels have been held at 315 marks at the works, but some Belgian makers underbid this figure. Steel Rails have been furnished the Prussian Government at 118.20 marks \approx ton, and no foreigners have underbid this. One of the leading Steel works quotes Steel Rails for mines 115 and Plates 150. The Wire branch is still upset; the Westphalian maker who declines to join a renewal of the Wire Nail syndicate declares that he does not wish to bind himself to fixed rates for the export trade, but that he will join any new strictly domestic syndicate. *Metals.*—Lead has declined to 13.80 @ 14.80 marks \approx 50 kilos, German. *Spelter.*—The Upper Silesian group of Spelter works announce that the renewal for three years and a half of the International Spelter Syndicate from July 1 next is a desideratum, provided all makers agree that production be increased 5%. They consider a timely ventilation of the matter desirable.—*Borsenhalle.*

WEST INDIES.

PORT OF SPAIN, TRINIDAD, November 9, 1888.—*Asphaltum.*—During the fortnight a steady export demand has prevailed at \$14.04 \approx ton, f.o.b., for Boiled, and \$9.84 Crude, including the export duty. Shipments since January 1 amount to 46,097 tons, against 38,905 in 1887 and 31,677 in 1886. *Exchange* may be quoted \$4.80 @ \$4.86, 90 days, on London.—*E. P. Masson.*

NEW ZEALAND.

NELSON, October 12, 1888.—*Copper.*—For the purchase and further development of the Aniseed Valley Copper mines in this district, Middle Island, the New Zealand Copper Company, Limited, has been formed, with a capital of £150,000 in £2 shares.—*Dunedin Mail.*

SOUTH AFRICA.

DURBAN, NATAL, October 18, 1888.—*Gold.*—According to mail advices from Delagoa Bay, there have been discovered on Sir Donald Currie's Gold fields, in Swaziland, extensive deposits of low-grade Gold Ores. The Ore is friable, the amount of it inexhaustible, and the find is considered one of the most important yet made in South Africa.—*Argus.*

The Pittsburgh committee of freight agents received notice last week from Commissioner Fink that the action of the committee in advancing the rates on iron and steel articles was ratified by the commissioners, and the new rates will

take effect January 1. They were advanced from the special rates formerly used to the basis of the fifth and sixth classes. The new rates from Pittsburgh are as follows: To New York, 18 and 15 cents; Philadelphia, 16 and 13; Baltimore, 15 and 12; Rochester, 14 and 11; Buffalo, 12 and 9; Utica, 16 and 13; Syracuse, 16 and 13; Oil City, 10 and 7. The former figures are for less than carloads, and the latter for carload shipments.

The Duration of Lightning Flashes.

It is well known that the lightning flash, or the spark between the terminals of an influence machine, exists for so short an interval of time as to be beyond measurement by any ordinary means. But notwithstanding the acceptance of this knowledge the peculiarities of some of the flashes photographed have been supposed to be due to the camera, or the sensitive plate, being at the time in a state of vibration. To test this line of thought Mr. James Wimshurst, according to *Engineering*, has made a dark slide for his camera in which is fitted a train of clockwork carrying a disk, upon which is an arrangement for holding the sensitive plate. When all is complete for photographing a flash the clockwork is wound up, the sensitive plate then rapidly acquires great velocity, which at the maximum reaches 2500 revolutions per minute, and with the plate rotating at this speed the spark is photographed. A photograph taken under these circumstances in no way indicates movement in a sensitive plate, for the photograph throughout its length is as sharp and as clear as though the plate had been at rest. The experiment is interesting, for it not only shows the infinitely short existence of the spark, but it also shows that chemical change in the sensitive film takes place in an equally minute interval of time.

The Secretary of War has awarded the contract for furnishing \$1,500,000 worth of steel forgings for 8, 10 and 12 inch high-power guns to the Bethlehem Iron Company, their bid being the lowest and within the statutory price. Award has also been made of the contract for furnishing cast-iron bodies for 80 mortars to the Builders' Company, of Providence, R. I., and that for the steel parts of the mortars to the Midvale Steel Company. The bids for assembling and completing the mortars were rejected as excessive.

The New York Hydraulic Supply Company have asked permission to lay mains through the city streets for the purpose of supplying public and private buildings with hydraulic power. The company profess to be prepared to pipe water from Poughkeepsie into the Croton reservoirs in sufficient quantity to supply the city's needs, without the addition of the proposed Quaker Bridge and other storage dams. The matter has been referred to the Department of Public Works.

In discussing a paper on triple-expansion marine engines recently read before an English engineering society, it was pointed out that in two ships alike in every respect except that the one has two-crank and the other three-crank engines, the consumption of coal per indicated horse-power is precisely the same, but that the three-crank engine drives its ship half a knot, or 6 per cent., faster than the two-crank engine. This is a very important point, and one which has not been sufficiently dwelt on by marine engineers, because in discussing the relative merits of the two and three crank engine it has been practically limited to comparing the consumption of coal per indicated horse-power.

Legal Decisions.

ASSIGNMENT OF WAGES.

A. who was employed by a steamboat company made an assignment to E. of his wages, under this employment, from October 15 to April 1 following. A. was discharged from the employment, but was again so employed on November 1 next ensuing. At the time of the discharge the company and A. contemplated this re-employment. The assignment was made for groceries furnished and to be furnished to A. and his family. A. failed to pay for the groceries and E. demanded from P., the proper officer of the company, during the term of the employment, the amount of the wages earned, which exceeded the grocery bill. Payment was refused and an equitable action brought—*Edwards vs. Peterson*—to which the defense was made that the assignment was not valid, since it was not made under an existing contract. The case was reserved for the Supreme Judicial Court of Maine, which upheld the contract. Judge Haskell, in the opinion, said: "Future wages to be earned under a present contract, imparting to them a potential existence, may be assigned, although the contract may be indefinite as to time and amount. This at law. But in equity an assignment of wages will be applied to wages to be earned under a prospective employment which is in contemplation. The assignment here is of wages to be earned of a certain employer within a specified time. It was seasonably recorded. No claim is made under it until actual notice has been given to the employer. No other creditor intervenes by an attachment, or otherwise objects to the validity of the assignment. The controversy is practically between the immediate parties to it. It cannot be said to contravene public policy. The consideration was most meritorious, and the assignment was not given to delay creditors. Whether such an assignment would be valid against subsequent attaching creditors, with or without notice, it is not necessary to decide. It is clear to our minds that this assignment must be upheld."

LIABILITY OF BANK DIRECTORS.

Depositors in a bank sued its directors for money lost by them because of the defalcation of the cashier. This officer owned one-fifth of the stock, was the leading spirit in the bank, was a man of recognized business ability, and was supposed to have the highest integrity. Yet it appeared that for nine years he had been making false entries in the books of the bank and had embezzled thereby a large amount of money. The services of the directors were gratuitous, and when the old bank was merged into the new one no new books were opened, so that the cashier was enabled to conceal his former defalcations, but there was nothing to excite the directors' suspicions, the fraud having been perpetrated through false entries. The duties of cashier, bookkeeper and teller were all performed by the defaulter. In this case the trial court held the directors were not responsible for negligence, and gave them a judgment and the case on appeal. Savings Bank of Louisville's Assignee *vs. Caperton* was also decided by the Court of Appeals of Kentucky in favor of the directors. That court, in the opinion, said: "Subordinates, and a cashier is such, must be supposed to act honestly until the contrary appears, and the law does not require their employers to entertain jealousies and suspicions without some apparent reason. The test of due care by the directors must necessarily be whether they have omitted that care which men of common prudence take of their own concerns. The examination by the directors of the books of the bank was

made in the usual way, and the fraud practiced eluded detection by means of a false balance-sheet. It is not for the court to point out the mode banks are to pursue to detect frauds; if they take the usual and uniform method adopted, not only by this, but other banks, they cannot be subject to the charge of negligence."

BANKING—COLLECTION.

N. was the receiving and paying teller of a bank, and in his embezzlement of \$30,000 he took \$1500, the proceeds of a note which had been left with him for collection. He entered the note in his own account, and had it put to his credit. The bank denied its liability, and M., the depositor, sued it and recovered a judgment. The case, on appeal to the Supreme Court of Texas—*City National Bank of Fort Worth vs. Martin*—was also ruled against the bank. Judge Maltbie, in the opinion, said: "It appears that N., the teller, after this money came into his hands, induced M. to allow him to lend it for him on a note, and that N. then took this note into his possession, and after collecting as his own in his account with the bank he appropriated the proceeds. It is claimed by the bank that this transaction relieves it of liability for the acts of the teller. But the bank does not do any such business as negotiating outside loans for its customers; it must be held to bring it in the regular banking business. It is further objected that he was only a teller to receive and pay out money; that he had no authority to collect notes. Let it be conceded that the duties of a teller, by the rules of banking, are thus limited. It was shown on the trial that the teller had on other occasions made collections for the bank; that would bind it for such collections by the teller. But, if this had not been shown, it is a well-known fact that the collection of money for others is a part of the regular business of all banks, and when a bank opens its doors for business with the public, and places officers in charge, persons dealing with them in good faith, and without notice of any want of authority in such officers, and the act done is within the apparent scope of the officers' authority, whether the officers were clothed with such authority or not, the party so dealing would be protected. If a bank does not wish the public to deal with any particular one of its officers at its regular place of business, in a particular line of that business, it would be its duty to so notify the public in some effectual way. The public certainly could not be expected to know that the person acting for the bank in the ordinary way was not duly authorized to perform customary duties. The bank must pay this judgment."

ATTORNEY AND CLIENT; MONEY RETAINED BY ATTORNEY.

W. took a summary proceeding to compel K., an attorney at law, to pay over money in his hands which W. claimed had been collected for him. K. replied that the money retained was his fee for collecting interest on a judgment for four years, he charging about 4 per cent. for his fee. W. denied that K. acted as his attorney at law in making these collections, though K. was his attorney of record in the judgment. The court below made a summary order upon K. to pay the retained money over to W., but on the appeal, *in re Kennedy*, to the Supreme Court of Pennsylvania, that court removed the order. Judge Paxson, in the opinion, said: "In the allegation of W., the petitioner, that there was no relation of attorney and client between them, it is very plain that the petition must be dismissed. It is only by virtue of such relation that the court has any jurisdiction to interfere in a summary manner in disputes between a client and his attorney. The court might as well make an order upon an

attorney to pay his tradesmen's bills. A man does not lose his right to a jury trial by being at attorney at law; he is fully entitled to try an issue of fact between himself and his client by a jury trial, as is any other citizen."

Efficiency of Marine Engines.

Improved valve gears, pistons, bearings, both as regards design and arrangement, the use of separate pumps for feed and circulating water, have all added to the efficiency of the mechanism of modern marine engines, although the multiplication and special arrangement of parts in some cases may have neutralized this improvement. Increased piston speed has led directly to economy of weight, the power developed being proportional to the speed of the piston, and the weight not being affected by the increased speed to any great extent. In the early marine engines from 150 to 200 feet per minute were the average piston speeds; now from 600 to 800 feet per minute are common, while speeds of upward of 1000 feet per minute are not unknown.

In order that high speeds may be safely and economically employed, it is necessary that the moving parts should be carefully balanced, the steam passages and ports carefully proportioned, the bearing surfaces ample, and that provision be made for a thorough system of lubrication. The extended use of steel has been the means of reducing weights of marine engines and boilers to a very considerable extent, a matter of which the importance will be more fully appreciated when we consider the statement which has been made that every ton of dead-weight capacity is worth, on an average, \$50 per annum for freight—that is to say, that every 100 tons saved from the weight of the engines and boilers, without increasing the cost of working, is equivalent to about \$5000 a year additional income to the owners.

Machinery for the Removal of Blast Furnace Cinder.—The *Engineer* reports that Hawdon's patent machinery for removing and loading up slag from the blast furnaces as fast as it is made is gradually getting more and more into use, and—at all events, in the Cleveland districts—is likely eventually to supersede all the older methods. It is already applied to the blast furnaces at Messrs. Sir B. Samuelson & Co.'s works, at Newport, and is also in operation at those of Edward Williams. The machinery is of the simplest kind. It consists of a small engine, which by means of gearing turns a pair of sheaves, round which a pair of long horizontal endless chains, like those of a dredging machine, pass. The other end of the chains passes round a similar pair of sheaves placed on a framework above the level of the wagons into which it is proposed to load the slag. Across the chain, and close together, are cast-iron dishes. The chains and dishes dip into a water tank on their way to the loading place. The stream of slag from the furnaces is made to pour into the dishes at the engine end. As they are filled they pass onward, the slag being cooled in the tank, and finally delivered in comparatively small pieces into the truck at the other end. The advantages of the new system are obvious. The old-fashioned plan of casting into large blocks, to be afterward broken up with great difficulty, is evidently wrong in principle. With Mr. Hawdon's system there is no dirt or dust, and the whole process goes on, day and night, with scarcely any attention beyond removal of the full wagons and substitution of empty ones. When tipped into barges for conveyance to sea there is no difficulty or danger to the craft. This is clearly not the case where it is delivered to the loading quay in masses weighing several tons.

Hardware.

There have been a number of conferences between manufacturers, but, for the most part, these have been for the purpose of considering the condition of the market and reaching a general understanding, rather than of taking any special action in regard to prices. There are, consequently, comparatively few changes to report, the general condition remaining as before. It is not anticipated that the opening of the year will bring with it many important changes.

Wire Nails.

For several weeks, while the agreement between the manufacturers of Wire Nails has nominally been maintained, there have been indications that the real condition of things was not entirely satisfactory, and that with an ostensible adherence to the terms of the arrangements there was in covert ways more or less irregularity. The result has been, in accordance with an intimation in our last issue, the practical breaking up of the combination, from which one of the leading Western companies has withdrawn, thus leaving the market again open and characterized by a good deal of uncertainty as to its future course. It is early at this writing to give definite figures, especially as in the existing condition of things buyers are indisposed to place orders for any considerable quantities, but we understand that some low prices have been named.

Cut Nails.

The New York market is quiet, with a slight disposition being manifested to purchase. We continue to quote \$1.80 @ \$1.90 for carload lots of Iron Nails.

A committee of Eastern Nail manufacturers has been conferring lately with representatives of the Western mills. It appears that, broadly, the outlines of the recently formed association in the Ohio Valley are as follows: According to the number of machines in each factory each mill is given a certain allotment. Monthly certified reports of sales are made. The aggregate of sales thus arrived at is credited pro rata to each concern according to its allotment. If its sales during the month have exceeded the allotment, the firm pays 10 cents per keg for the excess. If they are under it the works receive 10 cents per keg for the quantity below the allotment. It will be observed that this arrangement differs considerably from the usual allotment scheme, and that the makers do not know until the report is made up whether or not they have exceeded their share. It would certainly seem that the arrangement would cause a stoppage of indiscriminate cutting, under which the Nail trade in all parts of the country has suffered.

Miscellaneous Prices.

There has been another advance in Rope, both Manila and Sisal having been moved up $\frac{1}{2}$ cent per pound since our last issue. The following are the manufacturers' prices for large lots, with the regular discount of $1\frac{1}{2}$ per cent. for cash in 10 days:

	per pound.
Manila, $\frac{1}{4}$ inch and larger.....	14 $\frac{3}{4}$ c
Manila, $\frac{3}{8}$ inch.....	14 $\frac{1}{2}$ c
Manila, $\frac{1}{2}$ and 5-16 inch.....	13 $\frac{3}{4}$ c
Manila, Tarred Rope.....	13 $\frac{3}{4}$ c
Manila, Hay Rope.....	14 $\frac{3}{4}$ c
Sisal, $\frac{1}{4}$ inch and larger.....	12 $\frac{3}{4}$ c
Sisal, $\frac{3}{8}$ inch.....	12 $\frac{1}{2}$ c
Sisal, $\frac{1}{2}$ and 5-16 inch.....	13 $\frac{3}{4}$ c
Sisal, Hay Rope.....	12 $\frac{3}{4}$ c
Sisal, Tarred Rope.....	11 $\frac{3}{4}$ c
Sisal, Medium Lath Yarn.....	11 $\frac{1}{4}$ c

The market continues very strong, and, owing to the difficulty of obtaining the raw material, some manufacturers are refusing orders.

The following is the price list of the Union Metallic Cartridge Company, 19 Maiden lane, New York, and Bridgeport, Conn., for their Loaded Paper Shells, to which reference was made in our last issue. The U. M. C. Gun Wads are used, 1 card-board, 2 black edge over powder, 1 card-board over shot; packed 25 in a box, 500 in a case. The list as given below is subject to a discount of 40 per cent.

	Per 1000.
12 Ga. "Club" Waterproof, 8 drams, 1 oz. Nos. 7, 8, 9, 10, shot.....	\$25 00
12 Ga. "Club" Waterproof, $\frac{3}{4}$ drams, 1 $\frac{1}{2}$ oz. Nos. 5, 6, 7, 8, 9, shot.....	25 00
12 Ga. "Club" Waterproof, $\frac{3}{4}$ drams, 1 $\frac{1}{2}$ oz. Nos. 2, 3, 4, 5, 6, 7, 8, shot.....	26 00
12 Ga. "Club" Waterproof, $\frac{3}{4}$ drams, 1 $\frac{1}{2}$ oz. B.B. Nos. 2, 3, 4, shot.....	26 00
10 Ga. "Club" Waterproof, 4 drams, 1 $\frac{1}{2}$ oz. Nos. 8, 9, 10, shot.....	27 50
10 Ga. "Club" Waterproof, $\frac{4}{4}$ drams, 1 $\frac{1}{2}$ oz. Nos. 6, 7, 8, shot.....	27 50
10 Ga. "Club" Waterproof, $\frac{4}{4}$ drams, 1 $\frac{1}{2}$ oz. Nos. 5, 6, 7, 8, shot.....	28 50
10 Ga. "Club" Waterproof, $\frac{4}{4}$ drams, 1 $\frac{1}{2}$ oz. B.B. Nos. 2, 3, 4, 5, 6, 7, 8, shot.....	28 50

The above 38 combinations are regarded as sufficient for general requirements, but all other loads will be supplied to order at the following additions to list prices:

	12 Ga.	10 Ga.
Chilled Shot.....	\$1.00	\$1.00
2 U. M. C. Pink Edge Wads.....	1.10	1.60
American Wood Powder.....	10.00	12.50
Schultz Powder.....	15.00	20.00

The manufacturers of Rivets have been conferring in regard to the condition of the market, but no change has been made in prices. The condition of this line of goods is regarded as very satisfactory and the regularity which has prevailed for some time is gratifying.

Henry Huber & Co., 81 Beekman street, New York, send out the following sheet of trade discounts with their recently issued catalogue of plumbing goods:

	Dis. per cent
Pneumatic Water Closets: Tidal Wave class.....	20
Cascade.....	20
Slop Safes, Cast Iron Enameled and Porcelain.....	20
Syphon Water Closet, Surf.....	20
Closet Pulls.....	Net
Ornamental Brackets, Cast Iron, Bronzed.....	20
Ornamental Brackets, Cast Brass.....	20
Floor Plates.....	Net
Closet Seats.....	20
Washout and Hopper Combinations.....	20
Pneumatic Flushing Apparatus.....	20
Cast Iron and Copper Lined Wood Cistern.....	20
Earthenware Hoppers and Closet Bowls, Cast Iron Enameled Hoppers.....	20
Cast Lead Service Boxes.....	20
Urinals and Periodical Flushing Cisterns.....	20
Bath and Basin Supplies.....	20
Decorated New Departure Basins.....	20
Brass Pipes and Bends.....	20
Self-closing Basin Cock, Boyle's Patent.....	30
Self-closing Faucets.....	40
Cut-off.....	20
Carr's Water-Closets.....	20
Carr's Hopper Closets.....	40
Safe for Slop Hopper.....	20
Hopper Stand and French Bowl.....	20
Carr's Valves and Urinals.....	20
Carr's Brass Pumps.....	20
Carr's Cabinet Woodwork.....	25
Repairs.....	20

Wrought-Steel Locks.

The Russell & Erwin Mfg. Company, New York and New Britain, Conn., make on page 64 an announcement which will be recognized as of special interest and importance, relating as it does to a new line of goods which they are now prepared to supply to the trade. These new goods are reversible mortise knob Locks and Latches, made from wrought steel, which they offer at prices which puts them in competition with the regular cast-iron goods. The following numbers, including both Locks and Latches, are now ready for the market, and are sold from the list prices given, which are subject to the usual discount:

No. 1040, Mortise Latch, Wrought-Steel Case and Front, Iron Bolt.....	\$1.65
No. 1041 $\frac{1}{2}$, Mortise Latch, Wrought-Steel Case, Brass Front and Bolt.....	4.75

No. 1750, $\frac{3}{4}$ -Inch Mortise Knob Lock, Wrought-Steel Case and Front, two Bolts and Nickel-Plated Key.....	3.65
No. 1751, $\frac{3}{4}$ -Inch Mortise Knob Lock, Wrought-Steel Case and Front, two Bolts and Nickel-Plated Steel Key.....	5.00
No. 1753, $\frac{3}{4}$ -Inch Mortise Knob Lock, Wrought-Steel Case, Brass Front, two Bolts, Bright Cases and Nickel-Plated Key.....	8.00
No. 1754, $\frac{3}{4}$ -Inch Mortise Knob Lock, Wrought-Steel Case, Brass Front, two Bolts, Bright Cases and Nickel-Plated Steel Key.....	8.50

In addition to the strength and finish of these goods, their lightness is especially emphasized, as indicated in the following statement of weights: Locks, complete with screws, packed in cases of 12 dozen—weight per case, 141 pounds; Latches, complete with screws, packed in cases of 50 dozen—weight per case, 221 pounds. This line will be enlarged, we are advised, as rapidly as may be; and, meanwhile, this new departure and advance in manufacturing methods will be regarded as of especial significance and importance.

Trade.

Our advices from Louisville, under date of December 22, are as follows:

The Hardware trade of Louisville, Ky., has held its own remarkably well during the past week, sales being quite up to last report and above corresponding time of last year. A jobber, speaking of the reduction of profits, asserts that, to make the same aggregate amount of sales, the trade has now to handle double the quantity of goods that it took about ten years ago, with comparatively little reduction in the expenses of selling and shipping; and, as an instance, mentioned the price was then on a certain Lock 10 per cent. on list, and now it is 70 per cent. off. The consumers get the benefit of all this margin caused by competition, first between manufacturers, and then between distributors. This is all very good for the consumers, but their needs are limited in every line, and when a break comes, like those of Wire Nails and Barbed Wire, it helps no one, and shows that production is too great, and looks as if manufacturers were not working on a safe basis, when they are compelled to sell at any sacrifice just to secure means to meet maturing paper. It discloses to the dealers a weak status, which shakes their faith, not only in those goods, but all similar lines.

Barbed Wire is completely demoralized. Certain mills who reach this territory, after stocking up the small trade through the South and West at low figures, have made another break for the jobbers. Where it will end, no one knows. Unlicensed Wire, made west of the Mississippi, is going largely into the South. It is apparent that some Wire Nail mill acted in bad faith and succeeded in breaking up a happy family that was pointed to with pride by their older Cut Nail brethren. What is causing the general weakness displayed by the Iron and Steel trade is hard to get at, especially as all were looking for a coming régime of prosperity to manufacturers, preceded by excellent crops over the country. The strong consumptive demand is as yet the great safety valve of the trade. A few more such orders as the Ohio Falls Car Company has just secured from the Pennsylvania Railroad Company will brace up matters considerably in this section, and will give many a Merry Christmas and Happy New Year in the families of the mechanics.

Items.

The Lehigh Coal and Hardware Company, Lehigh, Pa., are preparing to issue a Seed Catalogue for the season of 1889, in which a number of pages will be devoted to advertisements.

The Ludlow-Saylor Wire Company, St. Louis, Mo., have issued their catalogue No. 19, which is devoted to Wrought Iron and Wire Fences, Counter and Office Railings, Window Guards, Wirework and Wire Goods of different kinds. An interesting line of Fences is thus exhibited, especial attention being called to the company's new Iron Fences, in which, instead of having the upright rods passed through the horizontal bars or rails, thus impairing their strength, the rails are left entire, the picket-heads being separately clamped on. The clamps and picket-heads are made of malleable iron, thus giving greater strength, and the point is made that by this method

of construction a choice of picket-heads may be had by the purchaser. On the first page of the catalogue is the representation of the artistic sign separately illustrated on page 6.

Wiley & Russell Mfg. Company, Greenfield, Mass., in the catalogue and price list recently issued, describe their Patent Screw-Cutting and other Labor Saving Machinery and Tools, special prominence being given to the Lightning and Green River Screw Plates and Bolt-Cutting Machines for hand and power. Their Taps are referred to as all machine relieved, the teeth being adjusted with absolute precision and uniformity, both as to shape and size, by special machinery, which is said to be exceptionally complete. They direct special attention to their Spiral Reamers, both for chucking and finishing. The catalogue illustrates their well-known line of Shrinkers, Tire Benders, Drilling Machines, Bolt-Cutting Machines, &c.

The McFadden Company, successors to Tallman & McFadden, 1025 Market street, Philadelphia, Pa., are about to issue a new catalogue, No. 80, of which we have been favored with an advance copy. It is a large and well-printed volume showing the exceedingly complete line of goods handled by them, including Tools, Hardware, Supplies, Cutlery, &c. The volume is an interesting exhibit of the variety of tools used by mechanics, and represents many staple machines and articles, together with many others that are not so widely known, including a number of novelties. The volume abounds in illustrations, which, with the descriptive matter, are compactly arranged, permitting the representation in comparatively small space of a large variety of goods. In their notice to the trade they explain that they have endeavored to make the catalogue complete by illustrating such tools, devices and supplies as their experience has shown to be required to meet the demands of their customers, and emphasize the point that they are not a commission house, and carry in stock all the standard sizes of every line listed in the book, and have the best facilities for promptly supplying other patterns. A very satisfactory index is prefixed to the volume, and the last page of the cover is occupied by an excellent representation of the front of their building.

A regular meeting of the Heavy Hardware Jobbers' National Union was held at the Grand Pacific Hotel, Chicago, on Wednesday and Thursday of last week. An informal dinner was given to the visiting members by the Chicago jobbers on Wednesday evening at the Union League Club house.

Edwin Hunt's Sons, 182 Lake street, Chicago, conduct a jobbing house which has had quite a notable history. It was founded in New York in 1833, its first location being at 70 John street. It was then removed to the corner of Platt and Gold streets, afterward to 19 Platt street, and in 1852 it was transferred from New York to Chicago. In the latter city the first store occupied was 79 Lake street, from which place it was removed to 84 Lake street. This was before the Tremont House was raised, and the streets of Chicago were then almost impassable for mud. It was necessary to build a bridge across Lake street to transfer goods. At this location the great Chicago fire of 1871 caught the house, and it went down in the general conflagration. After the fire a temporary shanty was secured at 146 Michigan avenue, in which business was conducted until better quarters were secured at 58 and 60 Lake street. From that place removal was finally made to the firm's present quarters. It is a remarkable fact that almost the only salvage from the

great fire was the padlock on the front door and the hasp which it secured. These have quite a history also. The padlock is a curiously made English letter padlock, having four rings with the full alphabet on each, thus setting to a four-letter combination. This padlock was used on the door of the firm's first store in New York, and is in use on their door at present. For 30 years the combination was never changed, as in all that time the same persons opened and closed the door. The hasp is only less venerable than the padlock, having been in use continuously since 1847.

The plumbing trade ought to congratulate itself on the number of handsome trade catalogues which it possesses, for the value and convenience of these publications can only be estimated by those who are favored with their use. The latest of the kind is sent us by Henry Huber & Co., 81 Beekman street, New York. The volume is 11 x 7½ inches in size, and is substantially and tastefully bound in dark cloth and contains over 200 pages. In the introductory note Messrs. Huber & Co. announce that since the issue of their 1887 catalogue they have added so many modifications of their pneumatic water-closet that they have found it necessary to issue a complete list of these closets in connection with numerous other goods of their manufacture, such as wash-basins, urinals, wash-out and hopper combinations, flushing cisterns, cast iron and copper lined, of many different styles. The volume is an exceptionally handsome publication; all the illustrations are finely executed, and are printed on excellent paper, and the accompanying text is very plain and clear. All the illustrations have necessary particulars, such as dimensions, &c., and wherever the principle of construction is referred to the operation is thoroughly explained. Accompanying it is a sheet of discounts, which we republish this week among prices in another column.

We are advised that the Braddock Wire Company, Pittsburgh, Pa., have given the exclusive agency for their Barb Wire for the Ohio and Mississippi valleys to the John F. Hazen Company, Cincinnati, Ohio.

The Standard Company, 57 Haverhill street, Boston, Mass., advise us that they have decided to make only double float Beaters, the Duplex and Rival. They refer to the price of the Rival as having been reduced so low that it is taking the place of the cheaper Beaters, and they will consequently no longer make the Acme, Kingston or Standard.

Walter L. Spitz and Joseph M. Rowland, of Philadelphia, lately with the Lloyd & Supplee Hardware Company, will return January 1 to Newlin, Knight & Co., with whom they were both formerly connected.

The trade will observe on page 48 the special notice signed "Territory," answers to which are to be addressed to our Chicago office. The advertiser desires to buy a part or a whole interest in a good retail Hardware house. We are advised that he is a man of large acquaintance in the trade, with a personal acquaintance with many manufacturers, and the opportunity is regarded as a favorable one for a party desiring thus to increase his capital, or dispose of a part, at least, of his business.

The Winchester Repeating Arms Company, New Haven, Conn., have issued their 1889 calendar, which contains striking and attractive illustrations relating to the sporting use of their Arms, their Repeating Rifles and Shot-Guns being thus brought prominently to notice.

Tendencies in Trade.

We continue below extracts from letters from manufacturers in regard to the question as to whether or not their direct dealings with retailers are increasing:

Pennsylvania.—We have agencies in New York and Boston, and, so far as Wire Nails are concerned, we think there is a decided disposition on the part of manufacturers to cater particularly to the carlot buyers. In these days of active competition there is, perhaps, no trade that the manufacturer can truthfully say belongs to him, but our experience is that the large jobbers particularly can be diverted at any time by the smallest concession, but the retailer is not so liable to change about.

New York.—In the Eastern States and New York and Pennsylvania our trade is almost entirely with the retail trade, and in the vicinity of large cities—like Philadelphia, for instance—the retail dealers send orders direct to us, although they can buy at the same price from the jobber and get the goods in less time than when ordered from us. We have repeatedly notified some of the retail dealers to this effect, but the orders come to us all the same, and we begin to believe that most retailers prefer to buy direct, even at the same price.

Pennsylvania.—Chicago is the only Western agency we have established, but we find that so much territory is tributary to Chicago that we do not deem it advisable to establish any other Western agency. It is not our experience that the direct trade between the retailers and manufacturers is increasing.

New York.—We have no established agency in any Western city except Chicago, but dispose of our product principally through the jobbing trade. Formerly we sent out salesmen and solicited the retail trade, which, at the time, was successful, but latterly, owing to the fact that Cutlery is carried as a side line by so many travelers, the expenses are too large in proportion to the amount of sales, and we are compelled to do our business through jobbers.

Connecticut.—Our Chicago house is the only Western house which we have established. All the principal jobbers in St. Louis handle our goods, and indeed the same is true of all the jobbers throughout the West. Our staple goods are principally handled by jobbers, while our fine Hardware is so largely special that it is difficult to generalize from it as to any tendency of the manufacturers to deal with the retailer direct.

Ohio.—We do not think there is any increase in the direct trade between the manufacturers and the retailers. Small manufacturers cannot afford to pay traveling men to drum such trade. They prefer to do business with the jobbers, so that their goods will reach all the trade and be continually before the buyers. A manufacturer who does his business through jobbers is represented by as many as 300 salesmen. We believe in protecting the jobbers.

Illinois.—Our observations are that the retailers, such as now buy from the jobber, want to put themselves on record with their trade as buying direct, and everything being equal will give the manufacturer the preference. They can then say to their customers: "We buy direct; our expenses are moderate, and we can sell you cheaper than the larger dealer." We think the opportunity is all that is wanted for the retailer to draw his supplies direct from the manufacturer.

New York.—We have no direct representation west of Chicago, as we cover the trade all through with our travelers, taking Chicago as headquarters and shipping point for the Western trade. We are supplying the jobbing trade almost universally with our goods. At the same time we have felt almost the necessity of going to the retail trade, as the jobbing trade are not enthusiastic over a new line until,

as they say, there is a demand for them. In other words, they do not stop to investigate the merits of a line of goods, simply saying, "When we have a call for your goods we will order them." For this reason we have in the East gone to the retail trade quite extensively, and at the same time we have turned in our orders to the jobbing trade.

Ohio.—In reference to the Western market, would say we formerly depended more on that than Eastern market, as our line was more particularly adapted to that section of the country, but as we have largely increased our line we are looking more to the East, at the same time increasing our Western business. In reference to the direct trade with retailers, would say that we find where retailers buy in a small way they prefer to give their trade to the jobbing houses, thus saving their freights. We have some good trade with houses who do not claim to be jobbers, but are in a position to handle large quantities of some special goods of ours. While we have a good many customers among the jobbers, and do our best to protect them in their profits, yet we feel that one man's money is as good as another's, and are inclined to name our low prices to parties who can buy the largest quantity and pay their bills promptly.

New Jersey.—The West is proving a better market for us every year, from which we argue that the manufacture of fine Hardware, &c. is possible outside of Connecticut.

Ohio.—There is undoubtedly an increasing tendency on the part of large consumers to try and get their supplies of Screws direct from the manufacturers, but so far as retailers are concerned it is easier for them to order items like Screws, Tacks, &c., from the jobber, of whom they are buying their General Hardware, than to divide the order up, particularly as they are very likely to get lower prices for these small items from the jobber than they can from the manufacturers.

Stock-Taking Methods.

Taking account of stock is an engrossing occupation among merchants about this time of the year. In comparatively few branches of trade, however, is this task beset with as much difficulty as in wholesale Hardware. Every year the stock increases in variety, requiring more room for broken packages, and adding to the work of stock-taking immensely. It is impossible wholly to suspend sales during this period, and there is consequently more or less interference with the work of the clerks engaged in inventorying by other clerks getting out goods and filling bills. With a sufficiently large force of clerks it would, of course, be possible to perform this task in a single evening after the last bill of goods had been packed, without interruption from any cause whatever. But few establishments have occasion to employ such a large force regularly, and the temporary addition of inexperienced persons would be a hindrance, rather than an aid, so that such rapid work is not feasible. Under existing conditions, therefore, it is deemed very satisfactory if a complete inventory can be made in three or four days. Even this is remarkably quick work compared with the experience of some of the largest Hardware establishments in the country only a few years since. At that time the greater part of the month was required, and if an active condition of trade prevailed concurrently the result of the inventory was a mere approximation to the stock on hand, and by no means expressed its exact condition. By the methods now followed in well-regulated houses, stock-taking has become much more correct in its results, as well as condensed in time. So far as work is concerned, however, that has not been abbreviated, and in the nature of things cannot be. Preparations

are begun some days, and even a week or more, before the regular business of stock-taking is entered upon. All Shelf Goods are arranged in order, the stock being apt to get slightly mixed in the hurry of getting out goods, which would be a hindrance in stock-taking if allowed to continue at that time. Loose goods or broken packages are tied up after account has been made, and the number contained in the package is then marked on the outside. Packages which have been accidentally turned upside down are straightened, so that a glance will suffice to see what they are. Goods in racks are straightened, and any that have strayed into the wrong bin are put where they belong. As far as possible they are counted, tied in bundles and ticketed; all this saves time, eventually, and can be done by those having charge of the stock at odd intervals. It is considered quite a feature of the preliminary work to arm each man with a brush, and have him remove all dust from the goods and from the shelves at the same time, thus performing a good job of house-cleaning. When the day arrives which has been fixed for

could be laid down. As long as palaces can be made from ice, there is no reason why a house cannot be made from solder.

Exports.

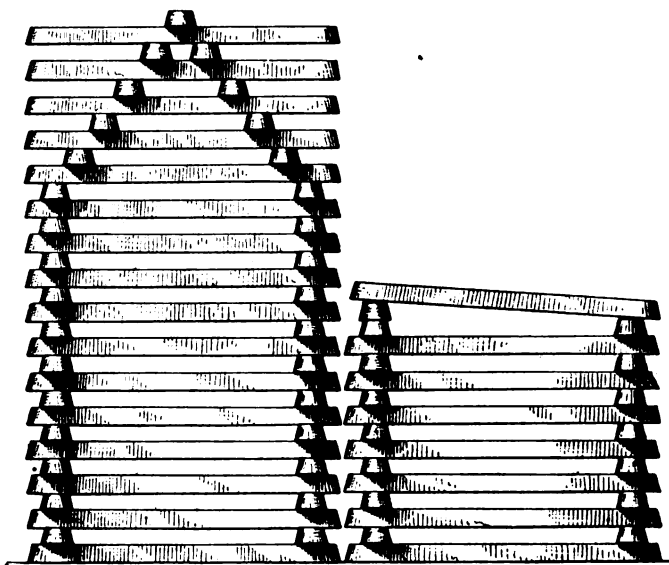
PER BARK J. H. INGERSOLL, FROM NEW YORK, DECEMBER 14, 1888, FOR PORT ELIZABETH, SOUTH AFRICA.

By *Coombs, Crosby & Eddy.*—32 Plows, 11 dozen Plow Parts, 5 dozen Hardware, 3 dozen Plow Parts, 12 dozen bundles Washboards, 12 dozen Traps, 104 dozen Plows, 10 dozen Axes, 1 dozen Sewing Machines, 3000 pounds Nails, 4 Pumps, 227 Stoves, 6 Wringers, 9 Washing Machines, 5 dozen Washboards, 3 gross Stove Polish, 9000 feet Safety Fuse, 6 Meat Cutters, 8 dozen Edge Tools, 3 gross Hardware, 6 Meat Cutters, 6 Snaths.

By *J. Norton & Sons.*—3 boxes Windmills, 120 dozen Pick Handles, 100 dozen Padlocks, 20 cases Slates.

By *A. Field & Co.*—6 Scales, 350 feet Hose.

By *Arkell & Douglas.*—48 sets Nuts, 2 dozen Whip Sockets, 8 cases Hardware, 20 dozen Hay Forks, 30 dozen Picks, 5 Ranges, 30 dozen Picks, 5 dozen Locks, 12 dozen Axes, 1 dozen Corn Shellers, 1 dozen Trucks, 4004 pounds Plow Shares, 2 dozen Draw-Knives, 2 dozen Barrows, 1 case Planes, 20 dozen Handles, 1 1/2 dozen Bird Cages, 1000 Handles, 1/2 dozen Scales, 1 package Castings, 5 1/2 dozen Planes, 1 dozen Axes, 5 Ranges, 151



Solder House for Advertising Purposes.

stock-taking it is the custom in one large establishment, which has come under our notice, to put two clerks at each end of a section of shelves and two in the center. They count the contents of each compartment, and mark the kinds of goods and the number of each on a card which is then tacked on the shelf. They are followed by a clerk who enters the quantities thus shown in a stockbook. For the purpose of guarding against errors in this list the manager of each department then follows with a clerk, and they make up a separate list, with which the first list is compared. The work is thus done expeditiously, as the packages were previously put in order, and it is also done accurately, or as nearly so as possible.

Dressing Show Windows.

A Boston correspondent writes: A very good "attraction" for the show-window of a plumber or dealer in metals can be made from bars of solder. Those who have made cobhouses in their childhood will require very little instruction in this style of architecture. The engraving gives an idea of a style of house that can be constructed from bars of solder. Those of an inventive turn of mind can, without doubt, improve upon the design presented. If the house was made larger, a rail fence constructed of the same material could be introduced, and in place of green grass in the yard, sheets of metal of some kind

dozen Locks, 1 dozen Shellers, 2 dozen Draw-Knives, 1 dozen Barrows, 1 case Planes, 18 dozen Washboards, 8 dozen Axes, 60 dozen Brooms, 20 dozen Handles, 1/2 dozen Scales, 1092 pounds Plow Shares, 30 dozen Shovels, 75 dozen Axes, 1 dozen Wire Goods, 7 dozen Chimneys, 1 box Castings, 5 Ranges, 104 Agricultural Implements.

By *W. H. Crossman & Bro.*—14,000 pounds Nails, 102 cases Plow Parts, 50 dozen Hatchets, 150 dozen Brooms, 100 dozen Handles, 8 Scales, 10 Scales, 2 Scales, 22 dozen Hatchets, 93 cases Plow Parts, 10 dozen Clocks, 24 dozen Locks, 24 dozen Curry Combs, 33 cases Slates, 57 cases Plow Parts, 103 dozen Hatchets, 20 dozen Picks, 1/2 dozen Sledges, 1 case Hardware, 5580 pounds Sash Weights, 314 pounds Sash Cord, 90 dozen Brooms, 12,500 pounds Nails.

PER BARK EMITA, FROM NEW YORK, DECEMBER 14, 1888, FOR CAPE TOWN, SOUTH AFRICA.

By *Arkell & Douglas.*—10 dozen Axes, 3 1/2 gross Axle Grease, 25 gross Clothes Pins.

By *M. Bertiner.*—1 Sewing Machine, 10 Stoves.

By *Strong & Trowbridge.*—9 cases Scales, 3 cases Handles, 6 cases Polish, 12 cases Axle Grease, 21 cases Clothes Pins, 2 cases Axes, 79 dozen Brooms, 7 cases Clocks.

By *W. B. Fox & Bro.*—1700 pounds Brooms, 635 Handles.

By *Leayercraft & Co.*—2247 pounds Rope.

By *W. H. Crossman & Bro.*—3 gross Blacking, 11,198 pounds Sisal Rope, 100 dozen Brooms, 6 dozen Wagons, 6 1/2 gross Axle Grease, 23 bundles Carriage-Ware.

PER BARK RICHARD PARSONS, FROM NEW YORK DECEMBER 15, 1888, FOR SIDNEY, N. S. W.

By *Arnold, Cheney & Co.*—8 cases Handles, 13 cases Brooms, 100 cases Handles, 21 cases

- Axles, 29 cases Axles, 380 boxes Clothes Pins, 45,968 pieces Roofing Slate.
- By McLean Bros. & Rigg.*—15 dozen Wrenches, 8800 Bolts, 8 dozen Shears, 8 Anvils, 6 Forges, 500 pounds Tacks, 12 dozen Curry Combs, 5 dozen Braces, 9 dozen Handled Axes, 3 dozen Corn Knives, 20 dozen Picks, 1½ dozen Store Trucks, 50 packages Carriage-Ware, 41 dozen Hand Lamps, 37 packages Carriage-Ware, 7 packages Agateware, 6 Corn Shellers, 120 gross Clothes Pins, 6 dozen Washboards, 140 pounds Nails, 8 dozen Axes, 4 gross Hooks.
- By V. Basanta.*—4 gross Hooks, 323 reams Sandpaper, 8 dozen Axes, 10 dozen Saws, 800 dozen Handles, 2 dozen Jacks, 50 dozen Axes, 30 dozen Hoes, 24 dozen Hoes, 24 dozen Wrenches, 42 dozen Wire Goods, 4 dozen Choppers, 2½ dozen Planes, &c., 36 dozen Saws, 924 pounds Nails, 6 9-12 dozen Lamp Goods.
- By Arkell & Douglas.*—30 dozen Handled Axes, 50 dozen Hammers, 85 dozen Traps, 1 dozen Handled Axes, 62 dozen Picks, 5 dozen Handled Axes, 7½ dozen Wheels, 30 sets Axles, 290 pounds Bolts, 375 pounds Hardware, 6400 Spokes, 130 sets Fellos, 1 case Hardware, 6 sets Bows, 12 pairs Iron Braces, 7800 Bolts, 1175 pounds Hardware, 4900 Spokes, 350 sets Fellos, 2 cases Hardware.
- By A. S. Lascelles & Co.*—24 cases Axle Grease, 45 cases Axes, 3 dozen Bush Hooks, 20 dozen Axes, 500 Broom Handles, 100 boxes Clothes Pins, 10 dozen Spades, 2 dozen Cages, 8 dozen Blocks, 3 dozen Grindstone Fittings, 6 dozen Gate Locks, 1 gross and 6 dozen Wire Rat Traps, 4 dozen Braces, 2½ gross Razor Strops, 9 cases Scales, 12 dozen Barbers' Scissors, 2 dozen Sad Irons, 112 pounds Washita Stones, 1 gross Locks, 10 gross Polish, 2 dozen Hair Clippers, 2 cases Hardware, 4 dozen Meat Cutters, 3 cases Hardware, 1 case Cartridges, 66 dozen Traps, 8 gross Lead Pencils.
- By George R. Patterson.*—4500 pounds Manila Cordage.
- By W. H. Crossman & Bro.*—54 dozen Handles, 3 cases Plow Parts, 2 dozen Corn Mills, 1 case Hay Cutter Fittings, 71 Corn Shellers, 9 Wine Presses, 4 dozen Churns, 1 cask Pumps, 21 dozen Axes, 8 dozen Mattocks, 24 dozen Spading Forks, 3830 pounds Tacks, 2 cases Carpenters' Tools, 74 gross Wicks, 9 Stoves, 10 Windmills, 11 packages Hardware, 50 Vises, 2 dozen Guns, 1 case Gun Fittings, 12 dozen Mattocks, 12 dozen Wrenches, 40 dozen Handles, 38 dozen Files, 20 dozen Axes, 16 dozen Picks, 12 nests Pails, 6 dozen Rolling Pins, 18 dozen Washboards, 100 boxes Clothes Pins, 1 dozen Wringers, 15 dozen Razor Strops, 8 dozen Stencils, 33 cases Hardware, 8 cases Tools, 6 dozen Mattocks, 600 feet Hose, 7½ dozen Saws, 10,000 Cartridges, 1 dozen Reloading Tools, 1½ dozen Corn Mills, 6 dozen Rolling Pins, 12 nests Pails, 8 cases Hardware, 1 case Tools, 2 cases Lamp Goods, 1 gross Mop Handles, 2 cases Tools, 9 dozen Rakes, 36 dozen Handles, 30 dozen Cow Bells, 34 dozen Handles, 6000 Cartridges, 10 gross Machinery Oil, 6 dozen Grindstones, 4 cases Tools, 9 packages Hardware, 46 packages Carriage Ware, 7 cases Hardware, 1½ dozen Lawn Mowers, 2 cases Lamps, 2 cases Tools, 1 case Hardware, 4 cases Store Trucks, 6 cases Shellers.
- By Peters & Calhoun Company.*—2 cases Saddlery.
- By Fairbanks & Co.*—8 packages Trucks, 2 barrels Wheels.
- By Lazarus & Rosenfeld.*—1200 dozen Slates, 4 dozen Skates.
- By Rogers, Smith & Co.*—10 packages Plated-Ware.
- By Strong & Trowbridge.*—5 casks Pumps, 4 cases Carriage Castings, 2 cases Enamel Dressing, 8 cases Tools.
- By Coombs, Crosby & Eddy.*—25 cases Hoes, 48 cases Handles, 2 cases Clocks, 2 dozen Hammers.
- By W. K. Freeman.*—1583 pounds Tackle Blocks.
- By F. B. Wheeler & Co.*—4 cases Harness, 1629 pounds Wire Cloth, 10 dozen Brushes, 9 Poles and Neck Yokes.
- By H. W. Peabody & Co.*—24,000 feet Fuse.
- By Ansonia Clock Company.*—84 boxes Clocks, 26 boxes Clocks, 52 boxes Clocks.
- By P. D. Ackerman & Bro.*—3 casks Plated-Ware, 3 casks Plated-Ware, 3 casks Plated-Ware.
- By Bradley & Hubbard Mfg. Company.*—25 cases Lamp Goods.
- By Waterbury Clock Co.*—18 boxes Clocks.
- By Healy & Earl.*—12 cases Pumps, 8 packages Forges.
- By Russell & Erwin Mfg. Company.*—11 cases Hardware.
- By Meriden Britannia Company.*—2 packages Plated-Ware, 6 packages Plated-Ware.
- By Singer Mfg. Company.*—900 Sewing Machines and Parts.
- By Manhattan Brass Company.*—65 packages Hardware.
- By A. Field & Co.*—6 dozen Harness Trimming, 2 cases Harness-Ware.
- By H. F. Roberts.*—1 box Clocks, 1 box Clocks.
- By S. H. Payne.*—815 Skates, 100 Skates.
- By K. W. Cameron & Co.*—7 boxes Castings, 2 cases Saddlery, 1 case Saddlery, 1 case Saddlery, 1 case Harness Oil, 6 packages Blacking, 2 packages Blacking.
- PER BARK PANDA, FROM NEW YORK, DECEMBER 17, 1888, FOR PORT NATAL, AFRICA.
- By W. H. Crossman & Bro.*—54 cases Plow Parts, 48 dozen Handles, 10 dozen Axes, 120 dozen Brooms, 4803 pounds Sisal Rope, 8 Washers, 1 dozen Corn Shellers, 1 dozen Store Trucks, 2 dozen Axes, 12 dozen Hatchets, 100 dozen Handles, 6 dozen Axes, 128 dozen Handles, 6¼ dozen Meat Cutters, 120 dozen Hatchets, 77 cases Plow Parts, 1½ dozen Mangles, 10 dozen Axes, 560 pounds Nails, 120 dozen Brooms, 1 dozen Churns, 8 dozen Wheelbarrows.
- By Higginum Mfg. Company.*—2 cases Corn Mills.
- By Coombs, Crosby & Eddy.*—26 cases Plows, 1000 Broom Handles, 12 dozen Tools, 10 cases Slates, 36 doz. Handles, 12 dozen Hardware, 50 dozen Tools, 6 sets Axles, 34 pieces of Plated-Ware, 1 dozen Clocks, 1 Lamp.
- By Corner Bros. & Co.*—8 cases Hardware, 6 cases Slates, 103 cases Hardware, 180 cases Agricultural Implements.
- By Marcial & Co.*—9 Corn Shellers, 16 Axes, 22 Springs, 68 Axes, 5 dozen Brackets, 18 dozen Locks, 78 dozen Brackets, 266 pounds Stone, 15 pounds Wire Nails, 36 pounds Wire, 44½ dozen Bits, &c., 9 Trucks, 16 Dozen Picks, 5 dozen Axes, 7 dozen Hatchets, 1 dozen Adzes, 5 dozen Irons, 9 dozen Wrenches, 6 Meat Choppers, 194 dozen Handles, 11 dozen Saws, 5 dozen Trowels, 5 dozen Screw Drivers, 1 dozen Gauges, 24 dozen Compasses, 6 dozen Saw Backs, 12 Saws, 24 Clamps, 15 dozen Files, 2 dozen Braces, 10 Washers, 10 dozen Brooms, 10 dozen Handles, 5 dozen Rolling Pins, 5 gross Clothes Pins, 16 Plows, 125 Plow Points, 50 Plow Wheels, 6 Trucks, 6 Corn Shellers, 16 Plows, 4 Churns, 24 Pumps.
- PER SHIP GENERAL DOMVILLE, FROM NEW YORK, DECEMBER 17, 1888, FOR MELBOURNE, AUSTRALIA.
- By W. H. Crossman & Bro.*—450 dozen Handles, 11 4-12 dozen Perambulators, 6 cases Lamp Goods, 10 packages Hardware, 3 Wagon Jacks, 3 packages Oil Stones, 12 Gross Cotton Lines, 1 gross Whip Stocks, 3 dozen Meat Choppers, 200 pounds Handles, 396 dozen Handles, 12 cases Tools, 14 cases Hardware, 8 packages Lamp Goods, 124 dozen Axes, 3 gross Machine Oil, 1 dozen Meat Choppers, 1-6 dozen Sausage Stuffers, 2 dozen Bush Hooks, 14 dozen Axes, 2 dozen Hatchets, 4 dozen Mattocks, 600 pounds Nails, 4 cases Plated-Ware, 3 cases Hardware, 4½ dozen Rakes, 5 dozen Spading Forks, 6 cases Hardware, 8 cases Tools, 4 dozen Wringers, 2 dozen Clocks, 14 dozen Perambulators, 200 Boxes Clothes Pins, 30 kegs Nails, 14 Lawn Mowers, 00 dozen Axle Grease, 1 case Tools, ½ dozen Meat Choppers, 7 cases Tools, 5 packages Hardware, 102 pounds Rivets.
- By Arkell & Douglas.*—5000 pounds Nails, 60 dozen Hatchets, 25 dozen Brooms, 500 Broom Handles, 1 gross Shade Rollers, 1 gross Match Safes, 7 dozen Granite-Ware, 2 dozen Velocipedes, 48 dozen Handles, 1 dozen Wringers, 1½ dozen Saws, 10 dozen Axes, 1 gross Broom Handles, 50 gross Clothes Pins, 450 pounds Horse Nails, 13 gross Lamp Wicks, 1320 Spokes, 3 dozen Shafts, 1 dozen Locks, 100 pounds Castings, 2 dozen Wringers, ½ dozen Augers, 1 dozen Clocks, 10 dozen Hoes, 4 dozen Axes, 32 dozen Saws, 3 gross Hat and Coat Hooks, 3 dozen Meat Choppers, 1 box Hardware, 5 dozen Saw Handles, 6 dozen Wringers, 6½ dozen Braces, 60 dozen Tools, 6 gross Shoe Blacking, 2 dozen Miter Boxes, 2 dozen Wringers, 12 dozen Plumbs, 19 dozen Axes, 14 dozen Chisels, 46 dozen Axes, 8 dozen Braces, 1646 pounds Castings, 108 dozen Handles, 6 dozen Transom Lifters, 21 dozen Axes, 6 dozen Tools, 47 reams Sandpaper, 8 dozen Plumbs, 20 dozen Hoes, 4 dozen Lampware, 3 gross Hammers, 1 case Lamp Goods, 100 pounds Nails, 756 pounds Castings, 800 Spokes, 8 sets Wheels, 5 sets Wheels, 8 sets Wheels, 1134 pounds Bolts, 6 sets Wheels.
- By R. W. Cameron & Co.*—24 packages Carriage Ware, 15 cases Axles, 11 boxes Castings, 6 cases Bolts, 6 cases Axles, 5 cases Axles, 7 cases Axles, 4 cases Bolts, 18 cases Bolts, 18 cases Axles, 12 boxes Bolts, 7 boxes Saws, 11 boxes Hardware, 2 cases Hardware, 1 case Emery-Wheels, 1 box Hames, 3 Blowers, 8 boxes Agricultural Machinery, 1 Blower, 1 case Hardware, 4 cases Hardware, 4 cases Saddlery, 2 cases Window Shades, 1 case Forks, 2 cases Plumbs and Levels, 14 cases Door Locks, 2 cases Saws, 12 cases Axes, 6 cases Perambulators, 1 case Perambulators, 105 kegs Cut Steel Nails, 3 boxes Malleables, 10 boxes Bolts, 16 boxes Hubs and Spokes, 7 boxes Carriage Axles, 3 boxes Carriage Forgings, 5 boxes Hubs, 108,000 Slates, 52 cases Hardware, 176 cases Hardware, 50 boxes Clothes Pins.
- By Strong & Trowbridge.*—1 case Tools, 1 case Traps, 1 case Tools and Saws, 1 case Traps, 2 cases Rivets, 1 cask Pumps, 1 case Castings, 2 cases Wrenches, 2 cases Whetstones, 2 cases Lampware, 6 cases Machine Oil, 3 cases Hardware, 1 case Nails, 1 case Tools, 1 case Castings, 65 cases Axes, 30 cases Handles, 37 cases Handles, 15 cases Handles, 1 case Axles, 2 cases Carriage-Ware.
- By H. W. Peabody & Co.*—3 cases Tills, 1 case Clocks, 8400 pounds Nails, 19 packages Hardware, 13½ dozen Handles, 1 case Cartridges, 1 case Lampware, 1 case Agricultural Implements, 19 cases Wood-Working Machinery, 3 cases Hardware, 8 packages Hardware, 24,000 feet Fuse, 11,200 pounds Barb Wire, 4 cases Hardware, 31 packages Wringers, 1 cask Pumps, 2380 pounds Axle Grease, 20 cases Edge Tools, 2140 pounds Bolts, 101 pieces Hardware, 700 pounds Axle Grease.
- By McLean Bros. & Rigg.*—27 dozen Dog Collars, 12 dozen Padlocks, 4 gross Lead Pencils, 54 Store Trucks, 18 packages Lampware, 1 gross Scroll Saws, 18 dozen Pruning Shears, 57 dozen Wrenches, 57 dozen Saws, ½ dozen Store Trucks, 38 dozen Hammers, 48 dozen Axes, 24 dozen Lampware, 2 dozen Irons, 7 cases Agateware, 38 dozen Gate Latches, 1 dozen Drills, 30 dozen Brackets, 10 dozen Hay Forks, 48 dozen Mouse Traps, 8 dozen Carpet Sweepers, 95 dozen Axes, 3 dozen Alarm Tills, 60 gross Safety Pins, 24 Scrapers.
- By R. W. Forbes & Son.*—40 Axes, 2 boxes Oil Stone, 2 cases Kitchen-Ware, 3 packages Pumps, 4 boxes Clocks, 40 Oilers, 9 crates Hardware, 3 Oil Stoves, 3 cases Stamped-Ware, 8 packages Hardware, 12 Handles, ½ gross Match Safes, 12 dozen Forks, 493 Carriage Bolts, 4 Picks, 6 dozen Axes, 144 packages Carriage Woodware, 396 pounds Sandpaper, 150 sets Axles, 35 packages Carriage Hardware, 21 boxes Axes, 43 packages Carriage Woodwork.
- By Seth Thomas Clock Company.*—1818 Clocks.
- By Joseph Dixon Crucible Company.*—418 pounds Lead Pencils.
- By Nevins & Haviland.*—41 gross Shade Rollers.
- By J. W. Norton & Sons.*—1136 dozen Handles.
- By Singer Mfg. Co.*—520 cases Sewing Machines and Parts.
- By Waterbury Watch Company.*—6 cases Clocks.
- By Barber & Co.*—3997 pounds Iron Castings.
- By Welsh & Lea.*—15 cases Iron Bolts, 6 cases Saws.
- By Ansonia Clock Company.*—41 boxes Clocks.
- By Peck, Stow & Wilcox Company.*—4 cases Tools, 46 cases Hardware, 23 packages Hardware.
- By Morris, Strouse & Co.*—9 dozen Table Casters, 24 dozen Hammers, 72 dozen Iron Tacks, 1 dozen Money Drawers, 42 pounds Stone, 46 dozen Mouse Traps, 3 dozen Clothes Wringers, 350 gross Safety Pins, 6 gross Shade Rollers, 28 gross Tools, 32 gross Tools, 3 gross Kitchen Forks, 2 gross Hatchets, 50 pairs Roller Skates, 21 gross Drawer Pulls.
- By A. Field & Co.*—36 sets Springs, 78 Axes, 9 gross Snaps, 2 cases Harness Ware, 6 dozen Brushes, 2 gross Axle Grease, 2 gross Harness Ware, 4 gross Axle Grease, 3 gross Harness Ware, 12 gross Whips, 16 dozen Hardware.
- By Healy & Earl.*—2 cases Sandpaper, 2 cases Sandpaper, 10 cases Steam Governors, 2 cases Emery Machinery, 18 cases Woodworking Machinery.
- By Winchester Repeating Arms Company.*—12 Guns, 12,000 Metallic Cartridges.
- By Mailler & Quereau.*—6 cases Cultivators.
- By S. H. Payne.*—26 cases Plated-Ware.
- By E. Miller & Co.*—24 packages Lamp Goods, 22 packages Lamp Goods.
- By Bradley & Hubbard Mfg. Company.*—7 packages Lamp Goods.
- By Itley, Doubleday & Co.*—6¼ gross Axle grease.
- By W. K. Freeman & Co.*—20 cases Hardware.
- By F. B. Wheeler & Co.*—72 sets Axles, 6625 pounds Carriage Woodwork, 3 cases Hardware, 12 dozen Axes, 20 packages Hardware, 68 sets Harness.
- By Coombs, Crosby & Eddy.*—48 dozen Handles, 5 gross Hardware, 100 boxes Clothes Pins, 5 dozen Hardware, 11 dozen Hatchets, 28 dozen Rakes, 3 dozen Tools, 47 cases Slates.

The next annual meeting of the Ohio Institute of Mining Engineers will be held at Lyndon Hall, Columbus, Ohio, January 10 and 11, 1889. A large number of very excellent papers are expected, and the meeting promises to be one of great interest.

The Yankee Land Roller.

The accompanying illustration represents this machine, which is manufactured by the Wheel and Seeder Company, of Fond Du Lac, Wis. It is so constructed that the shell can be shipped empty, thus securing an important saving in freight. After it is received, the shells can be filled with stones to give the requisite weight, adapting it for use on different soils. The rollers weigh only from 600 to 800 pounds, and will weigh when filled from 1200 to 2800 pounds, as may be desired. The rear sections of this roller are hung independently on a pawl and socket coupling, and the weight of the driver is equally distributed on each section. It can be easily uncoupled by raising the tongue and unhooking the front section from the cross bar. The draft of the rear roll is referred

in which the blade is secured. The highest priced or Perfection screw-driver, Fig. 1, is intended to answer the same purpose as the ratchet drivers now in the market, with the advantage of greater

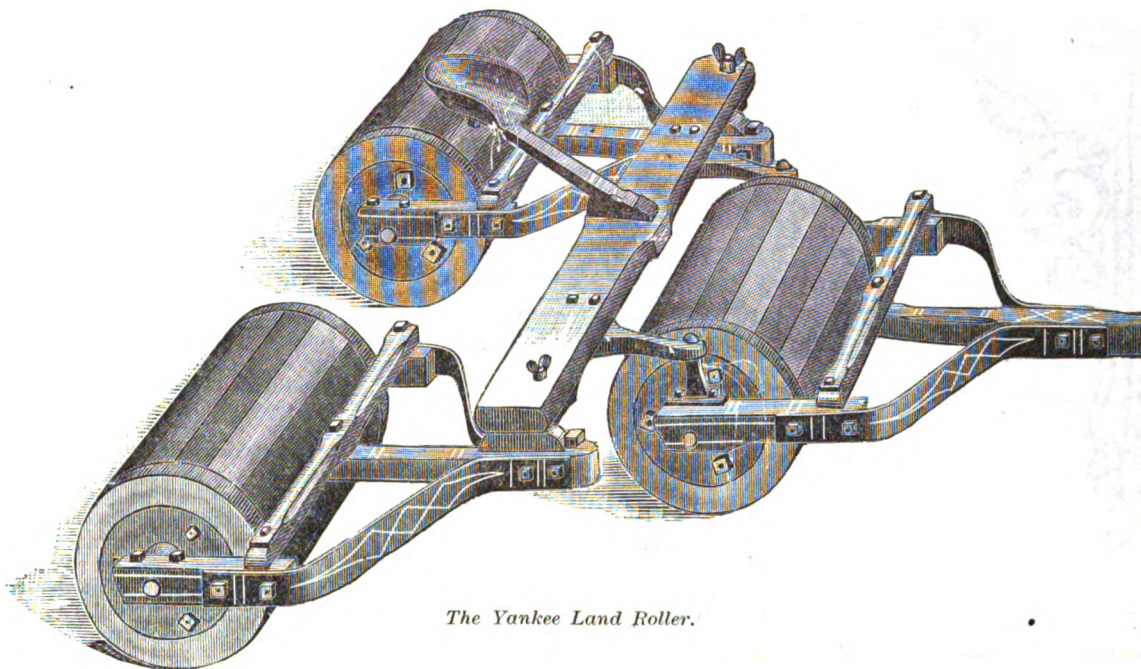
polished blade as the Perfection driver, but it differs from the latter in having a malleable iron sleeve, with external ribs or corrugations, firmly secured to the blade, and this sleeve thus attached to the



Fig. 1.—The Perfection Screw Driver.

simplicity and facility for use. As will be observed by the cut, a twelve-sided cone is fastened to the end of the blade, and this cone fits a corresponding twelve-sided cup which is firmly embedded in the wood of the handle at its strongest point. A coiled steel spring lies in the cup be-

blade is forced into the body of the handle, the corrugations cutting their way through the wood, the opening being closed with a wooden plug of the same material as the handle itself. Thus it will be seen that instead of having a tang driven into the weakest and smallest part



The Yankee Land Roller.

to as lessening the weight of the tongue on the horses' necks, thus making it easier on the horses. It is so equipped that it is easily handled, and turns around without difficulty. These rollers are built in three sizes: Three rolls, 9 feet wide, diameter of roll, 16 inches; three rolls, 12 feet wide, diameter of roll, 16 inches; three rolls, 15 feet wide, diameter of roll, 16 inches. The sections have cast-iron and hardwood staves $1\frac{1}{4}$ inches thick. The journal and portion of head can be removed for the purpose of filling the sections with grout or heavy mixture to get the desired weight. The following advantages in these rollers are referred to by the company: That they do the best work by getting the requisite weight on the ground; that they are easily handled, as they are not bound together with unnecessary framework; and that the taking off of two nuts separates the three sections, so that they can be readily stowed away.

New Screw-Drivers.

J. H. Sternbergh & Son, Reading, Pa., well known as manufacturers of bolts, nuts, rivets, washers, &c., have just entered upon the manufacture of an entirely new line of screw drivers embracing three different styles, illustrated herewith. The blades of these tools are made of round steel, highly polished, with elegant points, which are referred to as hardened and tempered for the purpose. The three styles of screw-drivers and the special features of their construction are represented in Figs. 1, 2 and 3, which give a sectional view of the handles, showing the manner

neath the cone. In driving a screw with this tool the blades become fast by pressure on the handle, as the cone is thus forced into its cup, and when the pressure is released the cone is forced out by the action of the screw, thus making it serve the function of a ratchet screw-driver, so that a screw may be driven into the wood

of the handle, the wood of which is liable to split, this screw-driver has the blade secured on the strongest part of the handle and firmly embedded, so that under severe use the handle is not liable to be injured in the least.

The Ideal screw-driver, Fig. 3, is described as having a flat beech wood



Fig. 2.—The Acme Screw Driver.

or turned out from the wood without shifting the hand. In this respect the manufacturers allude to the driver as having the advantage of simplicity over the screw-drivers having pawls to shift, and being more or less liable to get out of

handle of the natural color of the wood with brass ferrules, and differs from the other two described in having that part of the shank which enters the handle squared half its length and forced through a smaller bore than the size of the blade

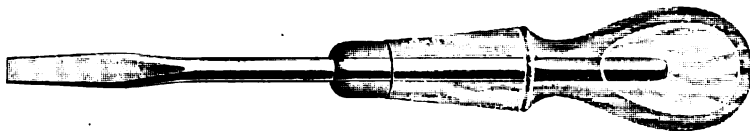


Fig. 3.—The Ideal Screw Driver.

order on account of their complicated construction. The tools are finely finished, with nickel-plated ferrules and ebonized handles.

The Acme screw-driver, Fig. 2, has a mahogany finished handle with nickel-plated ferrule, and the same highly

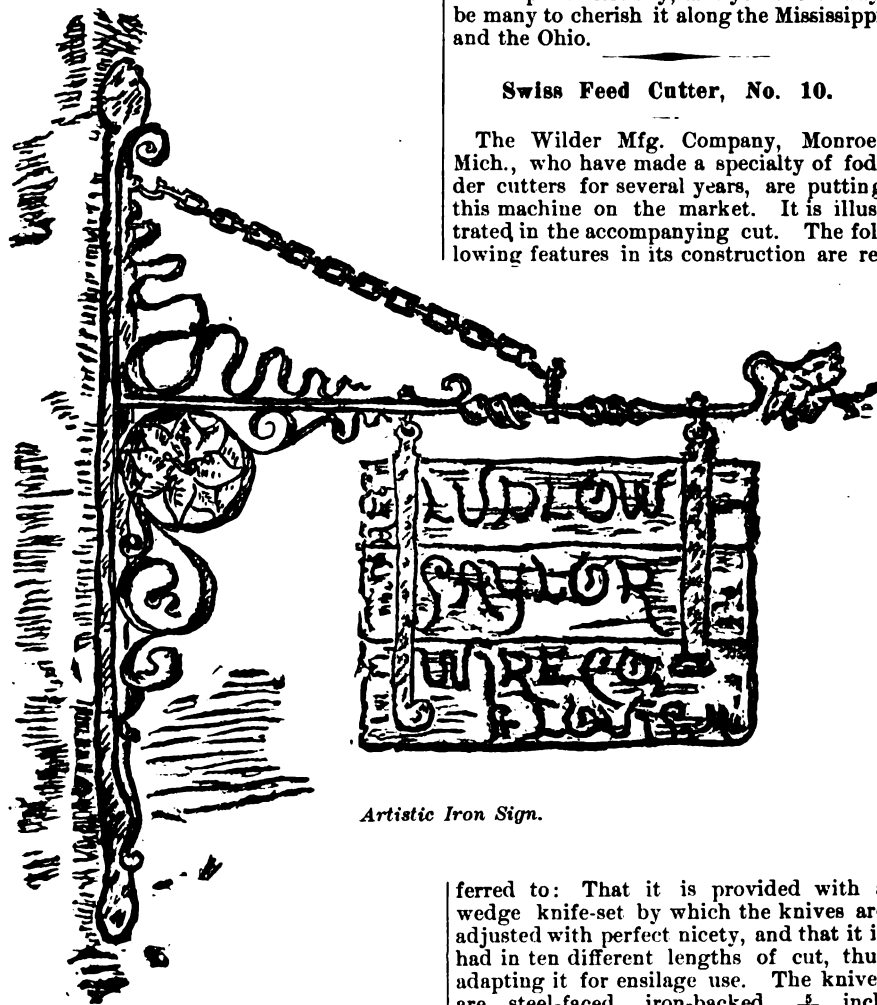
itself, thus firmly embedding the shank in the hardwood of the handle and making a substantial and elegant tool. It is, however, offered to meet the demand for a cheaper tool than either of the two above mentioned, while at the same time the blade will be as highly polished and

of the same material as the Perfection and Acme. It is thus the intention of the manufacturers in offering these three styles of screw-drivers to meet the wants

at a snail's pace and with ruinous consumption of steam power by the towboats. The idea of using such a route in competition with the lakes is too ludicrous to contemplate seriously, and yet there may be many to cherish it along the Mississippi and the Ohio.

Swiss Feed Cutter, No. 10.

The Wilder Mfg. Company, Monroe, Mich., who have made a specialty of fodder cutters for several years, are putting this machine on the market. It is illustrated in the accompanying cut. The following features in its construction are re-



Artistic Iron Sign.

of the trade, embracing low-priced, medium and ratchet screw-drivers. These goods will be placed on the market on January 1.

Artistic Sign.

The accompanying illustration represents a wrought-iron sign, which is manufactured by the Ludlow-Saylor Wire Company, St. Louis, Mo. It is made of iron throughout. The sign-board is usually painted black, and the letters are raised copper. The sign is treated in imitation of the Bauer-Barff process, and from its unique character, the tastefulness of the design, its attractiveness and durability will doubtless be appreciated by the trade.

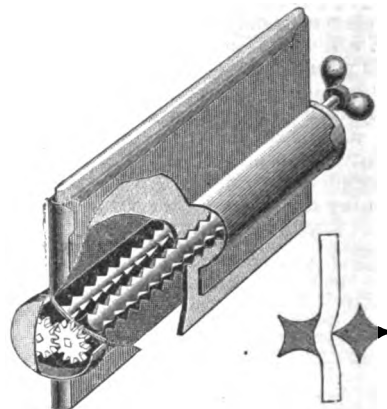
A Cleveland paper says the scheme made public at St. Paul, Minn., for establishing a route for iron ore shipments from the Lake Superior region to Pittsburgh, by rail to the Mississippi at the head of navigation and thence by river to the heart of the Western Pennsylvania iron region, may tickle the fancy of St. Paul enthusiasts, but it is a ridiculous child of some nimble imagination. The rail haul to St. Paul would be nearly or quite equal to the distance from the lake ports to Pittsburgh, and the question would therefore resolve itself into one of competition between the lake route and a river waterway twice as long. Judging from the experience of the Pittsburgh coal shippers with their barges, about the only time when much coarse freight can be sent down the Ohio is during a freshet or flood, and that would be the precise time when the ore barges could not possibly be towed up stream, except

ferred to: That it is provided with a wedge knife-set by which the knives are adjusted with perfect nicety, and that it is had in ten different lengths of cut, thus adapting it for ensilage use. The knives are steel-faced, iron-backed, $\frac{1}{8}$ inch thick, and described as perfectly tem-

pered. The precision with which, by means of the wedge knife-set, the knives can be adjusted, thus allowing the machine to be run at a high rate of speed without wearing the knives or blades or producing friction, is also alluded to. The capacity of the machine when run by power is stated to be from 1500 to 2500 pounds per hour, varying according to speed, nature of material and length of cut.

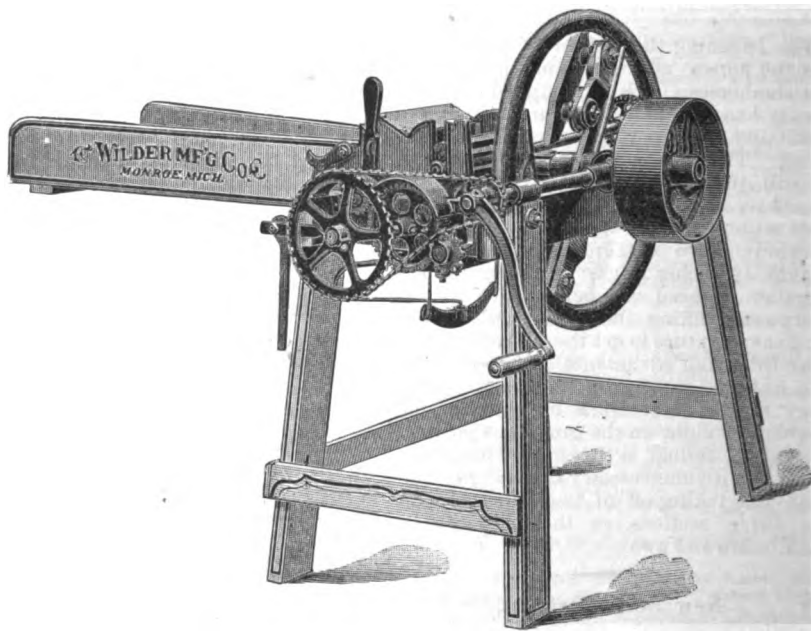
Improved Wick Raiser.

The American Oil Stove Company, Gardner, Mass., have lately incorporated in the construction of their American and Baby American oil stoves a form of wick raiser for which strong claims are made. The engraving presented herewith will afford the reader a very good idea of



Improved Wick Raiser.

its general appearance and the manner in which it operates. An inspection of the cut reveals the fact that the raisers consist essentially of two spindles, grooved both longitudinally and transversely, and so geared together that the crests of one spindle come opposite the longitudinal grooves of the other. The arrangement allows of a free passage for the oil, while the raisers engage the wick at 26 different points. Each spindle is constructed in a solid piece, no solder being employed. The housing or receptacle for the raiser is flush with the edge of the wick tube, which allows the raiser to come full to the edge of the wick. The device is claimed to give very good results in operation, all the essential constructive features being



Swiss Feed Cutter, No. 10.

fully covered by patents. It is strongly made, easily operated, and, possessing few parts, will not easily get out of order.

It is a curious development of the Treasury secret service that Italians constitute about one-half of the counterfeiters put under arrest. The United States can easily dispense with this development of the fine arts.

CURRENT HARDWARE PRICES.

DECEMBER 26, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.**Caps, Percussion, 7000—**

Black & Goldmark's	
F. L. Waterproof, 1-10's.....	50¢
F. L. Trimmings, 1-10's.....	25¢
R. B. Ground Edge, Central Fire, 1-10's.....	7 1/4 %
Double Waterproof, 1-10's.....	1.40
Musket Waterproof, 1-10's.....	60¢
G. D.....	23¢
S. B.....	30¢

Union Metallic Cartridge Co.

F. C. Trimmings.....	50¢
F. L. Ground.....	dis 25¢
Con. Fire Ground.....	70¢
Double Waterproof.....	7 1/4 %
Double Waterproof, in 1-10's.....	1.40
S. B. Genuine Imported.....	45¢
Shells R. B.....	54¢
Shells R. B. Waterproof, Central Fire.....	1.60

Cartridges—

Rim Fire Cartridges.....	dis 50¢5¢2 1/2
Rim Fire Military.....	dis 15¢2 1/2
Central Fire, Pistol and Rifle.....	dis 25¢5¢2 1/2
Central Fire, Military & Sporting.....	dis 15¢5¢2 1/2
Blank Cartridges, except 22 and 32 cal., an additional 10 % over above discounts.....	1.75, dis 2 1/2
Blank Cartridges, 32 cal.....	dis 15¢5¢2 1/2
Primed Shells and Bullets.....	dis 15¢5¢2 1/2
R. B. Cape, Round Ball.....	dis 1.75, dis 2 1/2
R. B. Cape, Conical Ball, Swaged.....	dis 2.00, dis 2 1/2

Primers—

Berdan Primers all sizes, and R. L. Caps (for Sturtevant Shells).....	dis 1.00, dis 2 1/2
All other Primers, all sizes.....	dis 1.20, dis 2 1/2

Shells—

First quality, 4, 8, 10 and 12 gauge.....	dis 25¢10¢2 1/2
First quality, 14, 16 and 20 gauge (\$10 list).....	dis 30¢10¢2 1/2
Star, Club, Rival and 10-gauge, \$10 list.....	dis 38 1/2 %
Climax Brands, 12 gauge, \$10 list.....	dis 210 2 %
Club, Rival and Climax Brands, 14, 16 and 20 gauge.....	dis 30¢10¢2 1/2
Seibold's Combination Shot Shells.....	dis 15¢2 1/2
Brass Shot Shells, 1st quality.....	dis 60¢2 1/2
Brass Shot Shells, Club, Rival, Climax.....	dis 65¢2 1/2
A. B. & C. Co., 10 & 12 gauge, d's 40¢5¢2 1/2	
A. B. & C. Co., "Special," 10 gauge, dis 30¢10¢2 1/2	
A. B. & C. Co., "Special," 10 & 12 gauge, 40¢10¢2 1/2	
Fowler's Patent, 10 & 12 gauge, \$100.....	dis 3.26

Shells Loaded—

List No. 19 1887.....	dis 20 & 10 %
U. M. C. & W. R. A.—R. E., 11 up.....	dis 3.00
U. M. C. & W. R. A.—R. E., 9&10.....	dis 2.30
U. M. C. & W. R. A.—R. E., 7&8.....	dis 2.00
U. M. C. & W. R. A.—R. E., 11 up.....	dis 3.10
U. M. C. & W. R. A.—P. E., 9&10.....	dis 4.00
U. M. C. & W. R. A.—P. E., 7&8.....	dis 4.00
Shells R. E., 11 up.....	dis 1.75
Shells P. E., 11 & 30.....	dis 3.30

Anvils—

Forge Anvil.....	dis 10¢, dis 20 & 30¢5 %
Peter Wright's.....	dis 35¢
Armstrong's Mouse Hole.....	dis 35¢
Armstrong's Mouse Hole, Extra.....	dis 1.15
Frederick's.....	dis 94¢
Wilkinson's.....	dis 94¢
J. & H. Carr. Patent Solid.....	dis 1.15

Anvil Vise and Drill—

Millers Falls Co.....	dis 18.00, dis 20 %
Onesey Anvil and Vise.....	dis 25 %
Allen Combined Anvil and Vise.....	dis 40¢10 %
Moore & Barnes Mfg. Co.....	dis 33 1/4 %

Apple Parers.

Advance.....	dis 4.75
Antrim Combination.....	dis 5.50
Baldwin.....	dis 5.25
Champion.....	dis 7.25
Eureka, 1888.....	dis 17.00
Family Bay State.....	dis 12.00
Gem.....	dis 5.25
Gold Medal.....	dis 4.00
Hudson's New 88.....	dis 3.75
Ideal.....	dis 4.75
Improved Bay State.....	dis 30.00
Little Star.....	dis 5.00
Monarch.....	dis 13.50
New Lightning.....	dis 5.50
Orion.....	dis 4.00
Penn.....	dis 4.00
Perfection.....	dis 4.00
Pomona.....	dis 4.00
Rocking Table.....	dis 6.00
Turntable.....	dis 4.50
Victor.....	dis 13.50
Waverly.....	dis 4.50
White Mountain.....	dis 4.50
72.....	dis 4.25
76.....	dis 5.75
78.....	dis 6.50

Angers and Bits.

Douglas Mfg. Co.....	dis 70 %
Wm. A. Ives & Co.....	dis 70 %
Humphreysville Mfg. Co.....	dis 70 %
French, Swift & Co. (P. H. Beecher).....	dis 55 %
Cook's, Douglas Mfg. Co.....	dis 55 %
Cook's, New Haven Copper Co.....	dis 50¢10¢50¢10¢5
Ives' Circular Lip.....	dis 60 %
Patent Solid Head.....	dis 30 %
C. E. Jennings & Co., No. 10, extension Lip.....	dis 40 %
C. E. Jennings & Co., No. 30.....	dis 60 %
C. E. Jennings & Co., Anger Bits, in fancy boxes.....	dis 30 %
Set, 33 1/4 quaters, No. 5, 36; No. 36, 32.....	dis 45 %
Lewis' Patent Single Twist.....	dis 25 %
Russell Jennings' Angers and Bits.....	dis 60¢63¢5
Imitation Jennings' Bits (new list).....	dis 80 %
Fugh's Black.....	dis 50¢10¢60 %
Car Bits.....	dis 15¢10 %
L'Hommedieu Car Bits.....	dis 10 %
Fortner Pat. Anger Bits.....	dis 10 %

Blow Aspers—

Ives.....	dis 25¢10 %
French, Swift & Co.....	dis 25¢10 %
Douglas.....	dis 40¢10 %
Bonney's Adjustable \$100.....	dis 40¢10 %
Stearns.....	dis 20¢10 %
Ives' Expansive, each \$4.50.....	dis 60¢10 %
Universal Expansive, each \$4.50.....	dis 20 %
Wood's.....	dis 20 & 25¢10

Expansive Bits—

Clark's small, 18; large, 226.....	dis 25 & 25¢5 %
Ives' No. 4, per doz.....	dis 25 & 40 %
Swan's.....	dis 40 %
Stearns, No. 1, 226; No. 2, 323.....	dis 25 %
Stearns' No. 2, 448.....	dis 20 %

Blind Fasteners.

Macrell's Screw Pattern.....	dis 25 & 25¢10 %
Van Sand's Old Pattern.....	dis 25 & 25¢10 %
Van Sand's Old Pattern.....	dis 25 & 25¢10 %
Washburn's Old Pattern.....	dis 25 & 25¢10 %
Merriman's.....	dis 25 & 25¢10 %
Austin & Eddy No. 2008.....	dis 25 & 25¢10 %
Security Gravity.....	dis 25 & 25¢10 %

Blind Staples.

Barbed, 1/2 in. and larger.....	dis 7 1/4 & 8¢ net
Barbed, 1/2 in.....	dis 7 1/4 & 8¢ net

Blocks.

Cleveland Block Co., Mal. iron.....	dis 50 %
Novelty Tackle Blocks, Mal. iron.....	dis 50 %

Belts.

Door and Shutter.....	dis 70 & 70¢10 %
Cast Iron Barrel Square, 2c.....	dis 70 & 70¢10 %
Cast Iron Shutter Bolts.....	dis 60¢10 %
Cast Iron Chain (Sargent's List).....	dis 60¢10 %
Ives' Patent Door Bolts.....	dis 60 %
Wrought Barrel.....	dis 70 & 70¢10 %
Wrought Square.....	dis 70 & 70¢10 %
Wt. Shutter, all iron, Stanley's list.....	dis 60¢10 %
Wt. Shutter, Brass Knob, Stanley's.....	dis 40¢10 %
Wrought Shutter, Sargent's list.....	dis 60¢10 %
Wrought Sunk Flush, Sargent's list.....	dis 55¢10 %
Wrought Sunk Flush, Stanley's list.....	dis 60¢10 %
Wrought Sunk Flush, Com'n Stanley's list.....	dis 55¢10 %

Carriage—

Com. list June 10, '84.....	dis 75¢23¢2 1/2
Genuine Eagle, list Oct. '84.....	dis 75¢10 %
Phila. pattern, list Oct. 7, '84.....	dis 75¢10 %
R. B. & W. old list.....	dis 70 %

Tire—

Common, list Feb. 23, 1888.....	dis 70 %
P. C. B. & N. Co., Empire, list Feb. 23, 1888.....	dis 70 %
P. C. B. & N. Co., Philadel., list Oct. '84.....	dis 82 1/2 %
P. C. B. & N. Co., Keystone, Phil. list Oct. '84.....	dis 80 %
P. C. B. & N. Co., Norway, Phil. list Oct. '84.....	dis 75¢10 %
Am. S. Co., East, Phil. list Oct. 16, '84.....	dis 80 %
Am. S. Co., Philadel., list Oct. 16, '84.....	dis 82 1/2 %
Am. S. Co., Bay State, list Feb. 23, '88.....	dis 70 %
R. B. & W., Philadel., list Oct. 16, 1884.....	dis 82 %
R. E. Mfg. Co.....	dis 70 %

Stove and Plow—

Stove.....	dis 60 1/2 %
Flow.....	dis 60 1/2 %
Am. S. Co. Stove, Annealed.....	dis 62 1/2 %
R. B. & W. Plow.....	dis 60 %
R. B. & W. Stove.....	dis 62 1/2 %
R. E. Mfg. Co. Stove.....	dis 62 1/2 %
Machine, according to size.....	dis 75¢10 & 80 %
Bolt Ends, according to size.....	dis 75¢10 & 80 %

Serax.

Without Angers, Upright, Angular.....	dis 50 %
Douglas.....	dis 50 %
Snell's, Rice's Patent.....	dis 40¢10¢2 1/2
Jennings.....	dis 45¢10 %
Phillips' Pat. with Angers 7.00.....	dis 7.50

Sew Pins.

Humason, Beckley & Co's.....	dis 60¢10 %
Sargent & Co's.....	dis 60¢10 %
Peck, Stow & W. Co.....	dis 50¢10 %

Braces.

Backus, Nos. 110 to 114 and 31 to 32.....	dis 60¢5¢60¢10 %
Backus, Nos. 6, 8, 12, 14.....	dis 60¢10 %
Backus, Nos. 16, 18, 20, 22, 7, 9, 11.....	dis 60¢10 %
Barber's, Nos. 10 to 16.....	dis 50 %
Barber's, Nos. 20 to 23.....	dis 50 %
Barber's, Nos. 40 to 63.....	dis 60¢10 %
Barker's, Nos. 8, 10 and 12.....	dis 75¢10 %
Barker's, Plated, Nos. 8, 10 and 12.....	dis 65¢10 %
Osgood's Ratchet.....	dis 40¢10 %
Spofford's.....	dis 40¢10 %
Ives' New Patent Novelty.....	dis 70 & 70¢5 %
Ives' New Haven Ratchet.....	dis 65¢5 %
Ives' Barber Ratchet.....	dis 60¢5 %
Ives' Barbers.....	dis 60¢5 %
Ives' Spofford.....	dis 60¢5 %

Common Ball, American.

Bartholomew's, Nos. 25, 27, 30.....	dis 50¢10 %
Bartholomew's, Nos. 117, 118, 119.....	dis 70 & 70¢5 %
Atkinson's Barker's Imp'd Plain.....	dis 75¢10 %
Amidon's Barker's Imp'd Nickel.....	dis 65¢10 %
Amidon's Ratchet.....	dis 75¢10 %
Amidon's Eclipse Ratchet.....	dis 60 %
Amidon's Globe Jawed.....	dis 40¢10 %
Amidon's Corner Brace.....	dis 40 & 40¢10 %
Amidon's Universal.....	dis 3 in., \$2.10; 10 in., \$2.25
Amidon's Buffalo Ball.....	dis \$1.10 & \$1.15
P. & W.....	dis 50¢10 %

Brackets.

Shelf, plain, Sargent's list.....	dis 55¢10 & 55¢10 %
Shelf, fancy, Sargent's list.....	dis 60¢10 & 60¢10 %
Reading, plain.....	dis 60¢10 & 60¢10 %
Reading, Rosette.....	dis 60¢10 & 60¢10 %

Bright Wire Goods.

Brilliers.....	dis 87 1/2 & 87 1/2 %
Henle's Self-Basting.....	dis 4.50 & 5.00
Buckets—See Well Buckets and Pails.....	
Bull Rings—Union Co. Nut.....	dis 55 %
Hotchkiss' low list.....	dis 30 %
Humason, Beckley & Co's.....	dis 70 %
Peck, Stow & W. Co's.....	dis 50¢10 & 50¢10 %
Elrich Hd. Co., White Metal, low list.....	dis 50¢10 %

Butcher's Cleavers.

Bradley's.....	dis 25 & 30
L. & J. White.....	dis 40 & 40¢5 %
Beatty's.....	dis 40 & 40¢5 %

Butts.

New Haven Edge Tool Co's.....	dis 40 %
P. S. & W.....	dis 33 1/2 %
Foster Bros.....	dis 30 %

Brass.

Wrought Brass.....	dis 70 & 70¢10 %
Cast Brass, Tiebout's.....	dis 33 1/2 %
Cast Brass, Corbin's Fast.....	dis 33 1/2 %
Cast Brass, Loose Joint.....	dis 33 1/2 %
Cast Iron.....	
Fast Joint, Narrow.....	dis 50¢10 %
Fast Joint, Broad.....	dis 55¢10 %
Loose Joint, Japanese.....	dis 33 1/2 %
Loose Joint, Jap. with Acorns.....	dis 33 1/2 %
Parliament Ruffs.....	dis 70¢10
Mayer's Hinges.....	dis 70¢10
Loose Pin, Acorns.....	dis 70¢10
Loose Pin, Acorns, Japanned.....	dis 70¢10
Loose Pin, Acorns, Jap. Flid. Type.....	dis 70¢10

Blind Fasteners.

Macrell's Screw Pattern.....	dis 25 & 25¢10 %
Van Sand's Old Pattern.....	dis 25 & 25¢10 %
Van Sand's Old Pattern.....	dis 25 & 25¢10 %
Washburn's Old Pattern.....	dis 25 & 25¢10 %
Merriman's.....	dis 25 & 25¢10 %
Austin & Eddy No. 2008.....	dis 25 & 25¢10 %
Security Gravity.....	dis 25 & 25¢10 %

Blind Staples.

Barbed, 1/2 in. and larger.....	dis 7 1/4 & 8¢ net
Barbed, 1/2 in.....	dis 7 1/4 & 8¢ net

Blocks.

Cleveland Block Co., Mal. iron.....	dis 50 %
Novelty Tackle Blocks, Mal. iron.....	dis 50 %

Belts.

Door and Shutter.....	dis 70 & 70¢10 %
Cast Iron Barrel Square, 2c.....	dis 70 & 70¢10 %
Cast Iron Shutter Bolts.....	dis 60¢10 %
Cast Iron Chain (Sargent's List).....	dis 60¢10 %
Ives' Patent Door Bolts.....	dis 60 %
Wrought Barrel.....	dis 70 & 70¢10 %
Wrought Square.....	dis 70 & 70¢10 %
Wt. Shutter, all iron, Stanley's list.....	dis 60¢10 %
Wt. Shutter, Brass Knob, Stanley's.....	dis 40¢10 %
Wrought Shutter, Sargent's list.....	dis 60¢10 %
Wrought Sunk Flush, Sargent's list.....	dis 55¢10 %
Wrought Sunk Flush, Stanley's list.....	dis 60¢10 %
Wrought Sunk Flush, Com'n Stanley's list.....	dis 55¢10 %

Carriage—

Com. list June 10, '84.....	dis 75¢23¢2 1/2
Genuine Eagle, list Oct. '84.....	dis 75¢10 %
Phila. pattern, list Oct. 7, '84.....	dis 75¢10 %
R. B. & W. old list.....	dis 70 %

Tire—

Common, list Feb. 23, 1888.....	dis 70 %
P. C. B. & N. Co., Empire, list Feb. 23, 1888.....	dis 70 %
P. C. B. & N. Co., Philadel., list Oct. '84.....	dis 82 1/2 %
P. C. B. & N. Co., Keystone, Phil. list Oct. '84.....	dis 80 %
P. C. B. & N. Co., Norway, Phil. list Oct. '84.....	dis 75¢10 %
Am. S. Co., East, Phil. list Oct. 16, '84.....	dis 80 %
Am. S. Co., Philadel., list Oct. 16, '84.....	dis 82 1/2 %
Am. S. Co., Bay State, list Feb. 23, '88.....	dis 70 %
R. B. & W., Philadel., list Oct. 16, 1884.....	dis 82 %
R. E. Mfg. Co.....	dis 70 %

Stove and Plow—

Stove.....	dis 60 1/2 %
Flow.....	dis 60 1/2 %
Am. S. Co. Stove, Annealed.....	dis 62 1/2 %
R. B. & W. Plow.....	dis 60 %
R. B. & W. Stove.....	dis 62 1/2

Wrought (Steel)—	
Fast Joint, Narrow.....	dis 70&10
Fast Joint, L. Narrow.....	dis 70&10
Fast Joint, Broad.....	dis 70&10
Loose Joint, Broad.....	dis 70&10
Table Butts, Light Flange, &c.....	dis 70&10
Inside Blind, Regular.....	dis 70&10
Inside Blind, Light.....	dis 70&10
Loose Pin.....	dis 70&10
Bronzed Wrought Butts.....	dis 40&10 to 40&10&5

Calibers.—See Compasses.

Calks, Tee	
Gautier.....	dis 5&6 to 6&6
Dewicks.....	dis 5&6 to 6&6

Can Openers.	
Messengers' Comet.....	dis \$3.00, dis 25
American.....	dis 30.00, dis 25
Duplex.....	dis 25.00, dis 15 @ 20
Lyman's.....	dis \$3.75, dis 20
No. 4, French.....	dis 25.00, dis 55 @ 20
No. 5, Iron handle.....	dis 25.00, dis 20
Eureka.....	dis \$2.50, dis 10
Sardine Scissors.....	dis \$2.75, dis 10
Star.....	dis \$2.75
Sprague, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 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420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 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1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 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Silver Lake, O. Quality. White (only)..... 77¢ @ 32¢
 Sylvan Spring, Extra Braided, White..... 32¢
 Sylvan Spring, Extra Braided, Drab..... 32¢
 Semper Idem, Braided, White..... 30¢
 Egyptian, India Hemp, Braided..... 32¢
 Samson, Braided, White Cotton..... 50¢ dia 30 @ 30¢ 5
 Samson, Braided, Drab Cotton..... 50¢ dia 30 @ 30¢ 5
 Samson, Braided, Italian Hemp..... 55¢ dia 30 @ 30¢ 5
 Samson Braided Linen..... 60¢ dia 30 @ 30¢ 5

Sash Locks.
 Clark's No. 1, \$10.00; No. 2, \$8.00 ? gross..... dia 33¢ 5
 Ferguson's..... dia 30¢ 5
 Morris and Triumph, list Aug. 16, 1886..... dia 60¢ 5
 Victor..... 60¢ 10¢ 5
 Walkers..... dia 10¢ 5
 Reading Mfg. Co..... dia 60¢ 10¢ @ 65¢ 10¢ 10¢
 Hammond's Window Springs..... dia 40¢ 5
 Common Sense, Jap d. Cop'd and Braded..... ? gross \$16.00
 Common Sense, Nickel Plated..... ? gross \$16.00
 Universal..... dia 30¢ 5
 Kemshall's Gravity..... dia 60¢ 5
 Sedgwick's..... dia 60¢ 10¢ 5
 Corbin's Delay, list February 15, 1886..... dia 70¢ 5
 Payson's Perfect..... dia 60 @ 60¢ 10
 Huginlin's New and Improved Adjustable Sash Bal-
 ances, list Jan. 5, 1887..... dia 25¢ 2¢ 5
 Huginlin's New Sash Locks, list Jan. 4, '87 dia 35¢ 5¢ 5
 Huginlin's Practical..... dia 60¢ 5
 Ives' Patent Sash Lock..... dia 60¢ 5
 Liesche's No. 100 & 110 ? gro. \$8; 106, \$10, dia 30¢ 10
 Davis, Bronze, Barnes Mfg. Co..... dia 50¢ 5
 Champion Safety, list March 1, 1888..... dia 55¢ 5¢ 5
 Security..... dia 70¢ 5

Sash Weights.
 Solid Eyes..... ? ton, 25¢

Damage Stuffers or Fillers.
 Miller's "Challenge"..... ? dos. 30, dia 50¢ 50¢ 5
 Berry..... ? dos. No. 1, \$15 @ No. 0, \$21, dia 60¢ 50¢ 5
 Drayton's..... 50¢ dia 30 @ 30¢ 5
 Enterprise Mfg. Co..... dia 30¢ 10 @ 30¢ 5
 Offner's..... dia 40¢ 10¢ 5

Saws.
 Diston's Otterclaw..... dia 45¢ 45¢ 5 ? Extras some-
 diston's Cross Cuts, dia 45¢ 45¢ 5 ? times given by
 Drayton's..... dia 35¢ 25¢ 5 ? jobbers
 Atkins' Circular..... dia 50¢ 5
 Atkins' Silver Steel Diamond X Cuts..... ? foot 70¢
 Atkins' Special Steel Dexter X Cuts..... ? foot 50¢
 Atkins' Special Steel Diamond X Cuts..... ? foot 30¢
 Atkins' Champion and Electric Tooth X Cuts..... ? foot 27 @ 22¢
 Atkins' Hollow Back X Cuts..... ? foot 15¢
 Atkins' Shingle, Mulay, Drab, &c..... dia 45¢ 5
 W. M. & C. Hand..... dia 30¢ 5 @ 30¢ 10
 W. M. & C. Champion X Cuts, Regular ? foot, 24¢ @ 30¢
 W. M. & C. X Cuts, Thin Back..... ? foot 27¢ @ 30¢
 Peace Circular and Mill..... dia 45¢ 10¢ 5
 Peace and Metal and Rip..... dia 30¢ 10 @ 30¢ 10¢ 10¢
 Peace Circular and Mill..... dia 45¢ 10¢ 5
 Peace Cross Cuts, Thin Back..... ? foot 27¢ @ 30¢
 Richardson's Circular and Mill..... dia 45 @ 45¢ 10
 Richardson's X-Cuts, No. 1, 30¢; No. 2, 27¢; No. 3, 24¢
 Hack Saws—
 Griffin's Hack Saws, complete..... dia 40¢ 10 @ 50¢ 5
 State Hack Saw, blades only..... dia 40¢ 10¢ 5
 State Hack Saws and Blades..... dia 25¢
 Diamond Hack Saws and Blades..... dia 25¢
 Eureka and Crescent..... dia 25¢ 5

Saw Frames.
 White Vermont..... ? gro \$0 @ \$10
 Red, Polished, and Varished..... ? dos \$1.50, dia 25¢ 5

Saw Sets.
 Stillman's Genuine..... ? dos \$5.00 and \$7.75, dia 40¢ 5
 Stillman's Impts..... ? dos \$3.35 and \$5.50, dia 40¢ 10¢ 5
 Stillman's Cross Cuts..... ? dos \$2.00, dia 40¢ 10¢ 5
 Morrill's No. 1, \$15.00; No. 2 & 4, \$21..... dia 10¢ 10¢ 5
 Leach's..... No. 0, \$3.00; No. 1, \$15.00, dia 15¢ @ 30¢ 5
 Nash's..... dia 30¢ 10 @ 30¢ 10¢ 10¢
 Hammer, Hotchkiss..... \$5.50, dia 10¢ 5
 Hammer, Bemis & Call Co.'s new Patent..... dia 30¢ 5
 Bemis & Call Co.'s Lever and Spring Hammer, dia 30¢ 5
 Bemis & Call Co.'s Plate..... dia 10¢ 5
 Bemis & Call Co.'s Cross Cut..... dia 12¢ 5
 Alken's Genuine..... \$15.00, dia 50¢ 10¢
 Alken's Imitation..... \$7.00, dia 35¢ 5
 Hart's Patent Lever..... dia 30¢ 5
 Diston's Star, 30. No. 15, \$5.50, dia 30¢ 10¢ 10¢
 Diston's Star, 30. No. 15, \$5.50, dia 30¢ 10¢ 10¢
 Atkins' Critter on..... per dos No. 1, \$5.00, No. 2, \$6.00, dia 30¢ 5
 Crossman & Keller, No. 1, \$15.00; No. 2, \$24.00..... dia 10¢ 10¢ 5
 Avery's S & W Set and Punch..... dia 30¢ 5

Saw Tees.
 Atkins Perfection..... \$15.00; Excelsior \$6.00 ? dos

Scales.
 Hatch, Hunter, No. 171, good quality..... ? dos \$21
 Hatch, Tea, No. 161..... ? dos \$6.75 @ \$7.00
 Union Platform, Plain..... \$2.10 @ 2.30
 Union Platform, Striped..... \$2.30 @ 2.50
 Chatillon's Grocers' Trip Scales..... dia 50¢ 5
 Chatillon's Eureka..... dia 35¢ 5
 Chatillon's Favorite..... dia 30¢ 10¢ 5
 Riehle Bros.' Platform..... dia 5¢ 5

Scale Beams.
 Scale Beams, list of Jan. 13, 22, dia 50¢ 10 @ 50¢ 10¢ 5
 Chatillon's No. 1..... dia 45¢ 5
 Chatillon's No. 2..... dia 60¢ 5

Scrapers.
 Box Scrapers
 Box, 1 Handle..... ? dos \$4.00, dia 10¢ 5
 Box, 2 Handle..... ? dos \$5.00, dia 10¢ 5
 Deane Box and Ship..... dia 20¢ 10¢ 5
 Foot..... dia 60¢ 10¢ 5
 Ship, Common..... ? dos \$3.50 net
 Ship, Providence Tool Co..... dia 10¢ 5
 Porter's Pat. Window and Door Frame..... dia 33¢ 4¢ 10
 Screen Corner Irons, Warner's..... dia 33¢ 4¢ @ 33¢ 4¢ 10
 Stearns' Frames and Corners..... dia 25¢ @ 25¢ 10

Screw Drivers.
 Douglas Mfg Co..... dia 30¢ 10¢ 10¢ 5
 Diston's Patent Screwdriver..... dia 45¢ 10¢ 5
 Buck Bros..... dia 30¢ 5
 Stanley R. & L. Co.'s Varished Handles..... dia 65¢ 10¢ 5
 Stanley R. & L. Co.'s Black Handles..... dia 60¢ 10¢ 5
 Sargent & Co.'s No. 1 Forged Head..... dia 60¢ 10¢ 10¢ 5
 Sargent & Co.'s No. 30, 40 and 60..... dia 65¢ 10¢ 10¢ 5
 Crowder & Cowies' No. 1 Extra..... dia 60¢ 10¢ 5
 Knapp & Cowies' No. 00 & 1..... dia 60¢ 10¢ 5
 Knapp & Cowies' No. 00 & 1..... dia 60¢ 10¢ 5
 Stearns'..... dia 25¢ 10¢ 5
 Gay & Parsons..... dia 35¢ 5
 Champion..... dia 35¢ 10¢ 5
 Clark's Patent..... dia 30¢ 5
 Crowder & Cowies'..... dia 50¢ 5
 Elrich's Socket and Ratchet..... dia 25¢ @ 35¢ 10¢ 5
 Allard's Spiral, new list..... dia 25¢ 5
 Kolb's Common Sense..... ? dos \$5, dia 35¢ 5
 Syracuse Screw-Drive Bits..... dia 30 @ 30¢ 5
 Screw Driver Bits..... ? dos, 50¢ @ 75¢
 Screw Driver Bits..... ? dos, 50¢ @ 75¢
 P. D. & Co.'s, all Steel..... dia 25¢ @ 25¢ 10 @ 25¢ 10
 P. D. & Co.'s, all Steel..... dia 60¢ 5

Screws.
 Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887
 Flat Head Iron..... dia 70¢ 5
 Round Head Iron..... dia 65¢ 5
 Flat Head Brass..... dia 70¢ 5
 Round Head Brass..... dia 60¢ 5
 Flat Head Bronze..... dia 65¢ 5
 Round Head Bronze..... dia 60¢ 5

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